RAILROAD GAZETTE

FRIDAY, DECEMBER 9, 1898

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Contributions.

223 Cents Per Ton Mile.

New York, Dec. 6, 1898.

To the Editor of the Railroad Gazette:

I notice in your issue of Dec. 2, page 865, the paragraph under the above head about the freight rate on a Klondike railroad, where first-class freight costs $1.90 per 100 lbs. for a distance of 17 miles. Of course, you know that a man ought to pack 50 lbs. 20 miles a day, being 1,000-lb. miles. Men at $1 a day should take packages of 75 lbs. or so away from that Klondike railroad. A pack horse should carry 250 lbs. about 16 miles, or 4,000 lb.-miles a day. By these figures you will see that the Klondike freight rate can hardly be kept up, even if the trail is rough.

E. P. N.

[Is it not over bold to assume that a man can carry 50 lbs. 20 miles a day over a Klondike trail, and that he will do it for $1 a day?—Editor.]

Claim Swindlers.

Union Casualty & Surety Company of St. Louis, Claim Department, Chicago, Nov. 15, 1898.

To the Editor of the Railroad Gazette:

Referring to "An Incident in the Claim Department," in your issue of Nov. 11, some of your readers may care to know that Moffett Moddy and Davenport Doddy are now in Denver, under the watchful eyes of the police and railroad claim agents.

I send you an account of the death of "Charles F. Rice," another swindler, whose photograph is No. 731 Rogue's Gallery. As Rice had several suits pending against steam and street railroads, claim agents may be interested in knowing that his operations are at an end.

O. B. STUART.

Rice (which is probably only one of about 40 names which this man assumed) was arrested in Saginaw, Mich., and while in jail committed suicide, September 3. He is known to have collected fraudulent claims on 40 or more accident insurance policies. His method was to secure accident policies under different names, and then sprain his ankle while alighting from steam or street cars, or by stumbling in the gangway of steamboats. When injured he made a claim against the insurance company, and also against the transportation company. After meeting with an accident Rice went home, wrapped a rubber bandage about three inches wide and three feet long around his leg above the ankle, leaving it in place for twenty-four hours, or as long as he could stand the pain. Croton oil was used in connection with this bandage, to produce swelling and inflammation. When the surgeon arrived he found the foot so badly swollen that no thorough examination could be made, but it looked so bad that the case was usually passed. Rice used his wife, who sometimes passed as his sister, and her brother, to testify as witnesses. Rice killed himself in jail after signing a confession. He had suits pending against street railroads in Vassar and Lansing, Mich.; Ottumwa, Ia., and other places, but as each time a different name was used, it is thought that probably there are many more suits against transportation companies which have not been settled.

An American Locomotive in England.

Sydney, N. S. W., Oct. 24.

To the Editor of the Railroad Gazette.

In your issue for July 29 last, in which you illustrate the locomotive supplied by Messrs. Baldwin & Co. to the Lynton & Barnstaple Railroad, you remark that it is the first engine sent to England by these well-known makers, and that it will doubtless be a novelty to British eyes. While not doubting the latter statement, the former is scarcely correct, as the late Mr. Eames imported into England an engine early in the eighties for the purpose of displaying the power of his continuous brake for stopping trains at higher speeds than those which he thought British locomotives were then capable of.

The engine in question was built by Messrs. Baldwin in March, 1880, for the Philadelphia & Reading R.R. and bore the number 507. It was a 6 ft. 6 in. single, with 18 in. x 24 in. cylinder. After running for a short time on that line the builders took it back, owing, I believe, to some difficulties between them and the company. Mr. Eames subsequently took it to England, as before mentioned. Owing to leading gage difficulties it had to undergo some modifications before it could run on any road there.

So far as I am aware it was never used for the purpose intended by Mr. Eames. It was exhibited on a siding at the Alexandra Palace, London, and subsequently it was placed in a locomotive shed on the Great Northern Ry. Mr. Eames died not long afterward and the engine remained in the shed for some time doing nothing. It was eventually put up for auction and sold piecemeal for what it would fetch (about £170, I was informed).

Particulars of this engine and of some of its runs appeared in The Engineer, June 4, 1880, and Engineering, March 24, 1882.

HAYDN BAGGS.

What It Is Worth to Avoid Stopping a Train.

New York, Chicago & St. Louis Railroad Company, Cleveland, O., Nov. 25, 1898.

To the Editor of the Railroad Gazette:

The question you have put is rather a broad one, and if the expression "worth" is to be interpreted as meaning dollars and cents it is not an easy question to answer.

We made a few tests last year to determine the amount of time saved in the movement of certain of our fast passenger trains and fast freight trains on a portion of our road where there are a number of railroad crossings at grade and one bridge, which are not protected by interlocking. We made four runs with one of our fast passenger trains, two making all the stops for railroad crossings (train coming to an absolutely dead stop in each instance), the other two in which no stop was made. The weather conditions were substantially the same. Trains leaving one terminal late were permitted to make up all the time they could. Without the stops about 14 per cent. in time was saved and the saving in fuel consumption was equal to about 50 cents.

We also made a test with several of our fast freight trains, selecting a train carrying uniform tonnage, the train carrying 1,081 tons, exclusive of engine, tender and caboose. Averaging results for the several trips, there was a saving in time of about 10 per cent. and saving in fuel per trip amounted to about 52 cents. There was also a slight saving in water consumption.

Assuming these tests as a basis, taking the average traffic over that district, there would be an apparent money saving of $350 per month for fuel. The interest account and the expenses for operation and maintenance (over and above the present cost for operation) of interlocking these crossings in question would probably amount to $5,000 per annum, so that on the score of dollars and cents we would not be anything ahead if the crossings were interlocked.

However, the main object of abolishing open crossings at grade is to save time, and under some circumstances the saving of overtime on freight trains would probably largely increase the "dollars and cents" feature of it. It is from the commercial point of view, however, that a good many of these projects are now considered, and the shortening up of time in delivery of both freight and passenger traffic is a great desideratum. On a division of 276 miles in length the present passenger schedule could be easily reduced an hour without any particular change in the class of power, and with perhaps an increased train length.

The use of track tanks in place of water tanks or penstocks is in line with the same time-saving method, though I question very much whether the relative difference in value would be as great. A good deal depends, of course, upon the territory and the conditions under which the traffic is handled.

A. W. JOHNSTON,
General Superintendent.

The tests referred to by Mr. Johnston were made with five passenger trains and four freight trains. The runs were from Bellevue to Fort Wayne, 123.1 miles. According to the time-table, there are 14 railroad crossings between these places. The passenger trains weighed, including engine and tender, 328 tons each, and traveled between stations about 50 miles an hour, except for two stretches (five miles and seven miles), where the rate was 60 miles an hour. On the run in which the stops were made the amount of coal consumed averaged 11,400 lbs., while on those on which the stops were omitted it averaged 10,317 lbs. The schedule time was 3 h. 20 min., but the train started late in each case.

The weight of the freight trains, exclusive of engine, tender and caboose, was 1,082 tons for the trains that made the stops, and 1,080 tons for those which did not. The particulars of these trips as noted were:

	Stops made.	No stops.
Coal burned, per car mile, lbs.	3.20	3.00
Lbs. water evaporated per lb. coal	5.63	5.40
Lbs. water used for 100 ton miles.	54.18	48.89
Time, gross	8 h. 35 m.	6 h. 51 m.
Time in motion	7 h. 12 m.	6 h. 27 m.

The Theory of the Body Bolster.

Lehigh Valley Railroad, South Easton, Pa., Nov. 22, 1898.

To the Editor of The Railroad Gazette:

It was with great interest that I read the article in your issue of Nov. 18, on Schoen pressed steel body bolsters.* I take exception, however, to the first paragraph. I believe that body bolsters can be designed by calculation easily, and with better results than by experiment. As an illustration let us analyze the bolster for a 60,000-lbs. capacity car.

At the center the reinforcing plates make this portion of the bolster much stiffer in proportion to the load than the remainder; the dangerous or weakest section will be through the center plate rivet holes and as shown in Fig. A. The rivets holding the center plate are in compression, and as they fill the holes may be neglected. The rivet holes through the upper flanges must be subtracted, as that part of the beam is in tension. The center plate at this section has no effect on the moment of inertia and should be neglected. Locating the gravity axis we find the moment of inertia to be 139.4.

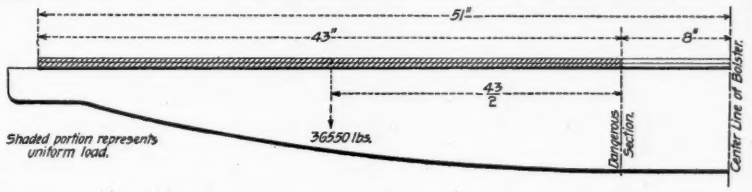

Fig. B.

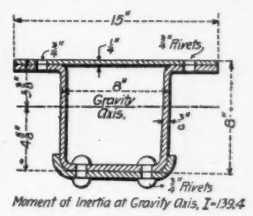

Fig A.

At this point it is necessary to consider what the load on the bolster is. All text books on mechanics state and prove, that when a load is applied suddenly and without impact, the resulting stresses are double the amount of those induced by gradual application or static conditions. On pages 157-161, of the M. C. B. Proceedings for 1896, Vol. 30, the committee on axles prove the live load on an axle due to vertical oscillations of springs to be 141 per cent. of the static load. The data from which this figure was derived were taken from a box car whose center of gravity was higher than a coal car, and consequently the amount deducted on account of the horizontal force is greater on this account. Under coal cars the live load on the bolster, due to spring vibrations, would be more than 141 per cent. of the static load and approaches nearer the theoretical 200 per cent. The action of such a load on the dangerous section is also greater than that due to the actual force, on account of its sudden application. From the above it would seem that the assumption of a live load on the bolster of the mean between 140 per cent. and 200 per cent., or 170 per cent., would not be irrational.

The next consideration is the manner of loading. While the load is communicated to the bolsters through the sills and truss bearers it will be no great error to assume that the bolster is a double cantilever, uniformly loaded. It may be asserted that the proportion of load carried by the center sills has no effect on the bolster when considered as a cantilever, but, on the other hand, this may be much more than offset by the concentrated loads on truss rod bearers, so that all in all, the above treatment seems fair. Fig. B shows this graphically. Resuming the analysis, we have:

Load carried	66,000 lbs.
Weight car body	20,000 lbs.
Static load	86,000 lbs.
Live load or 170 per cent. static	146,200 lbs.
Live load on one bolster	73,100 lbs.
Live load on one-half bolster	36,550 lbs.

As the dangerous section was taken at about 8 in. from the center, we have the portion of load beyond the dangerous section:—

$L = \frac{43}{43} \times 36{,}550 = 30{,}800$ lbs.

The bending moment is $M = \frac{1}{2}WL = \frac{f\,I}{e}$

where, W=30,800 lbs.
L=43 inches
f=stress per square inch
I=moment of inertia=139.4 biquad. inches.

*Two of the engravings in that article were misplaced. The engraving of the 100,000-lb. bolster appeared with the title of the bolster for the 80,000-car, and vice versa. Of course the error originated in the printing office; but "competent and honest inspection" in the editor's office would have caught it.—Editor.

c=distance of outermost fibres from neutral axis, which is:—
c, for compression=4⅝ in.
c, for tension=3⅜ in.

substituting in the above equation and transposing.

f (c)=(30800×43×4⅝)÷(2×139.4)=21,900 lbs. per sq. in.
f (t)=(30800×43×3⅜)÷(2×139.4)=16,000 lbs. per sq. in.

This method of figuring shows a fibre stress of 16,000 lbs. per sq. in. in tension, against the 11,000 lbs. claimed for it. Further, I do not consider the factor of safety of 5 claimed for a fibre stress of 12,000 lbs. on 60,000 lbs. steel a factor of safety. The theory of the fatigue of metal is now a generally accepted fact, and those not believing in it use a factor which virtually gives the same result. For a proof of this opinion I would refer you to the paper by Mr. Seaman on the Launhardt Formula. For those that believe in it, among whom I wish to be classed, Unwin gives as the deduction from Wöhler's experiments that, where a member has a variation in load between nothing and a maximum, the ultimate breaking strength of the material is .6 of its tensile strength. The load on a bolster due to the oscillation of springs very nearly approaches the above conditions, so that for steel of 60,000 lbs. tensile strength under these conditions we have as the ultimate strength to calculate from, .6 of 60,000 lbs. or 3,600 lbs. The bolster in question then has a factor of safety of 36,000÷16,000=2.25, instead of 5. It would seem that a factor of safety of 3 for tension would be more desirable, which would give a fibre stress of 12,000 lbs. per sq. in. The compression could safely run higher, and a limit of 18,000 lbs. per sq. in. in compression would be safe.

From the foregoing the design and calculation of a body bolster is shown to be not only possible, but also simple, and in many ways preferable to experiment.

F. F. G.

New York & Brooklyn Bridge.

New York, Dec. 5, 1898.

To the Editor of the Railroad Gazette:

Since the buckling of the lower chords of the stiffening trusses of the New York and Brooklyn Bridge, which occurred on July 29, 1898, the public has been more or less agitated about the safety of the bridge, and this agitation reached a climax when Col. Roebling published in the Railroad Gazette of Nov. 25 a letter in which he plainly asserts that the bridge frequently is overloaded, and, unless some remedy be given, that a similar accident may happen again with perhaps more serious consequences.

Mr. Collingwood gave a comprehensive description of the buckling with explanations of the causes leading to it, published in the Gazette of Nov. 18, and commented on by an editorial and by several other engineers. I will at this time not enter into an argument on the application of stays, but will only say that the fact of the chords having buckled is no proof that stays in themselves are dangerous or faulty, as some engineers believe and assert.

Having been on the engineering staff of the Brooklyn Bridge and having been the engineer who was specially commissioned by Chief Engineer Col. Roebling, to make the calculations and all theoretical investigations as to strength, stability and stiffness, and having considered all these points very thoroughly, I am in the position to speak with some certainty on this matter, and, if this were the time and place for a theoretical discussion, I believe I could give such methematical proofs that some engineers might be induced to at least modify somewhat their opinions.

That the chords buckled under a strain perhaps three or four times larger than intended for them is not more to be wondered at than when a hoisting rope breaks under a load of say 40 tons, which was bought and paid for to hoist but 10 tons.

However, the accident has occurred, and the general public is interested only in obtaining assurance that it will not occur again and that the bridge can safely be crossed.

It was known that the present Chief Engineer and Superintendent of the bridge, Mr. C. C. Martin, was instructed by Bridge Commissioner Shea to report on the present condition of the bridge, which report was expected with great interest. It was published by the daily press of Dec. 4, and extensively, though differently, commented upon by all the papers.

Mr. Martin declares the bridge to be safe, and while some papers accept Mr. Martin's assertion with full faith, picturing the bridge as carrying safely a load equal to all the battleships of the United States Navy, other papers are still doubting Mr. Martin's figures and published frightening pictures of the bridge at the moment of its collapse. Of course, engineers are not guided by such illustrations, but the public at large may still be confused and find reasons to feel timid.

I have carefully read Mr. Martin's report, which fully corroborates what Col. Roebling and Mr. Collingwood say, and without going into the details of a calculation, being familiar with the weights and dimensions of the bridge, I can as a whole indorse Mr. Martin's view. As far as it is possible for me to know, without having made a personal examination of the structure, and only judging from the reports, there is no doubt that the bridge is to-day as safe as it was in the past, and will be safe for the future, provided that the dead load is not increased, and that the rules laid down by Col. Roebling years ago for regulating the live loads are rigidly enforced.

The question arises, however, Will that be possible? Neither Mr. Martin nor Mr. Roebling can expect to be guardians of the bridge as long as the latter is supposed to last. The time will come when other men will manage the affairs of the bridge, when all rules and former accidents are forgotten, when the pressure of the public for more and better accommodations will increase, and when the bridge will again, to use Mr. Martin's expression, be "outrageously" overloaded, and when it may be connected with serious consequences. This may not mean a collapse of the whole bridge, but some local ruptures that may cause a panic with great loss of life, like on the memorable May 31, 1883, when there was a panic for less cause then there was on July 29, 1898.

Will the public be satisfied to depend for its safety on rules and regulations which any day may be violated? I believe not, and, in my opinion, the only correct way of treating this case is by stiffening and strengthening the bridge now sufficiently to make it safe for any possible load, without any kind of regulations and to avoid any possible accident. This can be done, as it has recently been demonstrated at the Covington and Cincinnati Suspension Bridge. This bridge has a span of 1,056 feet, built by John A. Roebling 32 years ago, and it passed precisely through the same conditions in which the Brooklyn Bridge is now. It was calculated and built for a certain amount of traffic, which it accommodated safely for 30 years, but finally the traffic outgrew its capacity and it became risky to subject the bridge to the increased and continuously increasing loads. The owners of the bridge wisely did not restrict the traffic, but they concluded to accommodate the bridge to the traffic at an expense of $500,000. It has been my good fortune to design and superintend this work, and from my experience gained in successfully completing the task of doubling the capacity and strength of the Cincinnati bridge, without having interrupted the travel on the bridge for a minute, I can confidently say that there would be no greater difficulty in doing the same for the Brooklyn Bridge. I have contrived a plan how to do this work without in any way overloading any part of the tower masonry, and, as an approximate estimate, it will not exceed the cost of $1,600,000. What I have in view is to leave the present floor arrangement as to tracks, roadways and footway, but to nearly double the strength of the bridge and secure it against all possible cases of accident. The reconstruction plan might be enlarged by providing an upper second floor for the passage of trolley and elevated railroad cars, which, at an expense not exceeding $2,500,000, would double the capacity of this bridge, which always will remain the main artery of travel between New York and Brooklyn, and which would make the building of a second bridge near the present location unnecessary for a long time to come.

W. HILDENBRAND.

From Trade to Profession—Advances in American Railroad Location.

By William G. Raymond.*

III.—FIELD METHODS.

The art of reconnoissance has not much changed in 20 or 25 years. The decision of the reconnoitering engineer is now made, however, on a much better understanding of the governing principles than formerly.

He recognizes now as his first duty the selection of the general route between proposed termini that will yield the greatest business; that is, that will reach the largest number of the better centers of population, or, in a new country, that will occupy the richest and most promising valleys. He recognizes as his second duty the selection of the particular line in the general route that will offer the lowest ruling grade. This once meant the lowest grade. Now it does not necessarily mean this, for a long line of 0.5 per cent. ruling grade, with a single division or grade of 1.3 per cent. is better than the same long line with 0.8 per cent. maximum grades scattered over all divisions. We have learned that it is economy to concentrate our high grades and reduce to the utmost our low grades. The men belonging to the class of Latrobe and Haupt knew this years ago, but now every trained engineer knows it. As a rule, not without exceptions, differences of curvature, rise and fall, distance, and even first cost, may be omitted in the comparison when there is a substantial difference in ruling grade.

Preliminary survey methods have been various. Three ways of making a preliminary and location survey, corresponding to as many epochs of time, will be noted.

The old way was to make the survey entirely by trial. The engineer in charge of the party used his "eye for country," and directed the placing of the line. He would run the line ahead a little way, sketching the salient features of the topography in the transitman's note book, or the topographer's, if there was one, making notes from time to time as the line cut a point too deep, or made a fill too great, that the line should be so many feet to the right or left, examining the profile from day to day, and in difficult work from hour to hour, and backing the whole party up one or more miles to begin over again if he found his grade line getting too steep, or that he was some greater distance than he thought wise from where he should be. Sometimes he would only make an offset if he thought he could guess with sufficient precision at the profile from the last correct point to the offset point. What was too steep or too far from the correct position was a matter of judgment or arbitrary rule. The intention seemed to be to put the line for the most part just where the final tangents were to lie; that the location should consist merely in connecting these tangents by the necessary curves.

An instance occurring on a preliminary survey in the Blue Valley in Kansas is an illustrative case. By the help of a county map and a connection with a section corner a line was computed to strike an invisible point at the bend of the river some distance ahead. The line was run over the level ground intervening, and, as was to be expected, did not strike just on proper ground at the bend, at which there was a bluff. Great was the expression of sorrow that the line had not hit at just the right point, and this regardless of the fact that the line must, in any event, be re-run on location, that the necessary change back would in no essential particular change the profile, and that there had been obtained the principal item of information to be obtained on a preliminary survey, precise knowledge of where to put the line. Too much faith was pinned to estimates based on preliminary profiles, and the effort to make these conform to what the location would show made virtually two locations of what should have been a preliminary and location.

This old method required a party of 8 to 10 men, besides the camp outfit. It is still the method, with modifications as to purpose that will be evident, to use in locating short branch lines where routes are fixed within narrow limits and lie on easy ground.

The second method, which followed the first, and, for a long time, had to struggle for recognition with the "eye for country" men, placed the line on the ground by judgment, but not with the same attention to precise detail as in the first method, and mapped a belt of topography along the line as a base, the width of the belt varying with the degree of uncertainty as to the position of the line. The topography was not sketched with hachured hills, as in the first method, but was carefully taken contour work, usually with five feet contour intervals. The line was run with a plain transit, with sometimes a gradienter attachment, and the profile taken in the ordinary way with the level and rod.

From the leveler's notes, placed on the map of the line run, which was drawn on sheets of convenient size for use in the field, the topography party, consisting of the topographer and two assistants, worked in the contours. The instruments used were hand-level, rod and tape, and pencil and scale. It was awful work in brush. When a particularly difficult spot was reached, admitting of many possibilities as to line and grade, it would be mapped by dividing the whole area to be covered into squares or rectangles, or by running lines over principal ridges and hollows, and making profiles in the ordinary way with level and rod along these lines. Contours were sketched in by the aid of these profiles.

On the topographical map obtained would be planned a location line to be afterward laid out on the ground, with such changes as might seem necessary during the progress of the work. This method corresponds with the ordinarily accepted rational process of planning any great work to fit irregular ground. It is absurd to say that any man, by merely looking at a rounded hill, can say that a 4° curve beginning at a definite station will fit the hill better than any other line. With a contour map in front of him he can plan much more nearly the first time. This is particularly true with young men, who have not learned by experience the "looks" of a 4° curve, but it is essentially true of all men who can read a map. The danger, which is practically overcome when it is recognized, is that the inexperienced eye will underrate the importance of what seem on the map to be insignificant irregularities, and that the character of the soil may be overlooked.

Almost all successful locating engineers now use this method, except in relatively unimportant lines, or where the ground is so flat and uninteresting as to make the location of the line apparent. The method requires from 11 to 14 men besides the camp.

The third method, the most modern one, and one that is still in its infancy and struggling for recognition, is merely a modification of the preceding. It is by far the most economical, and is the most expeditious in country offering any considerable difficulty. The one feature that does not commend it to the

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older practitioners is the lack of an accurate profile along the base line run.

The method is this: The line to be used as a base is selected by judgment as before, but instead of establishing stations at each hundred feet, stations are established only at instrument points. The distances from station to station are measured by stadia, and all elevations are carried by vertical angles and stadia distances. From the stations thus established readings are taken by stadia to enough points between stations and to the right and left of the line to furnish notes for a sufficiently precise contour may, which is drawn.

The first location is planned on the contour map and then placed on the ground as before. From the location line drawn on the map, a profile is called off from the map. It will lack the definiteness of an actually leveled profile, but if the work is well done it will approximate as closely for estimate purposes to the final profile as will the profile of a preliminary line run in the ordinary way.

When the first location is made in the usual manner, the rodman, after giving the ordinary readings, lays his rod across the line and from a clinometer placed on it determines the cross slope. This cross slope is recorded by the leveler and afterward used in making preliminary estimates, and in studying the line for possible betterment of the location. This thing should be done, by whatever method the line is determined.

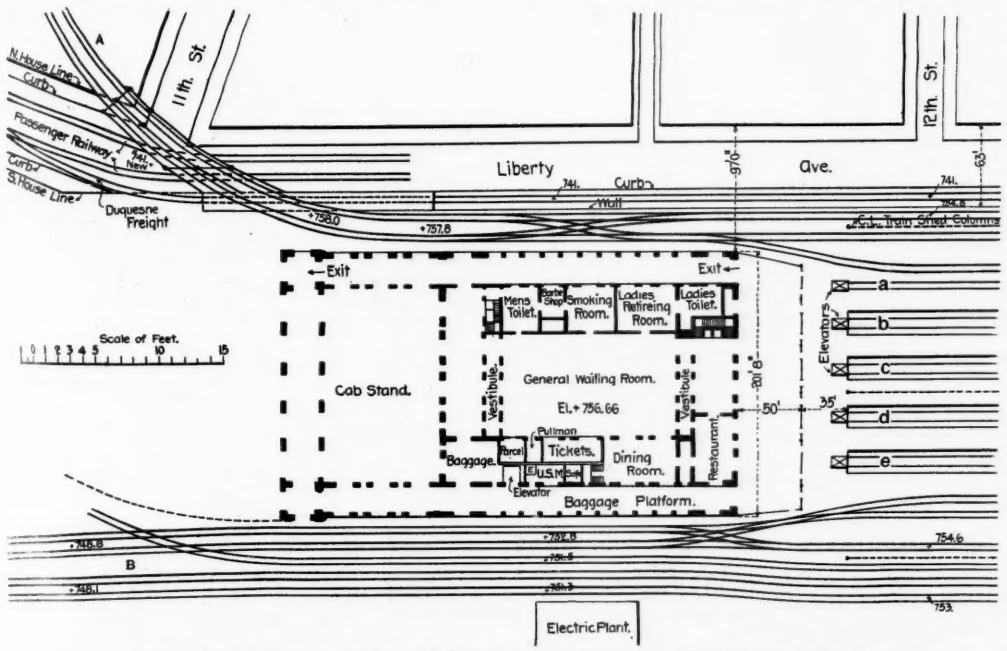
This method of preliminary survey requires from six to eight men, besides the camp, and more miles of line can ordinarily be covered in a day than by either of the preceding methods.

As to the desirability of the method little of a convincing character can be said. The writer has found it the most expeditious and economical method and one that produces results fully equal to those of the other methods outlined. This is his experience. Every engineer must satisfy himself by fair trial, for no amount of argument will be convincing in such matters. It is one of the purposes of this paper to urge the trial of the transit and stadia in location work by those who have not become familiar with it. Probably the best place to note the merit of the method is on some difficult work, where, as in crossing some mountain range, careful work is required to get development and to place the line on the best possible ground. A more or less elaborate topographical map is always required in such a place. The distance work, if care be taken, will be correct within one in two thousand or better, and there will be absolutely no cumulative errors. Every distance on the base line is measured twice. The angle work is as well done as in any other method, and, since the instrument is not transited, there is no resulting cumulative error from small errors of adjustment of the line of collimation, and no double centering is necessary.

But the element of greatest doubt in the minds of those who have not tried it is the vertical angle work for elevations. The limit of precision in this part of the work is not yet very definitely known, but the writer has made closures in 10-mile lines with the error only in the tenths, and on many miles of leveling checked by stadia he has invariably found that the important discrepancies have been due to the level work. There is more chance for error on the side pointings, since they are read but once. In the continuous line all vertical angles are read twice, once up and once down. The mean value read is used. The work requires an instrument with good plate bubbles, and a good bubble under the telescope. It is, moreover, much better to have an inverting glass, as better definition is thus secured and hence more precise work. It is not well to use the level rod for a stadia rod, but one designed especially for the work. It should be graduated to give distances to feet units in this country and metric units where that system is used.

The rod should not exceed twelve feet in length, which also means that distances read should not ordinarily exceed 1,200 feet. On instrumental reconnoissance, however, the rod may well be 15 feet long, with divisions permitting direct readings to five feet units, and estimation to single feet. The same degree of precision is not necessary on such work as on preliminary surveys. With such a rod, in open country, side readings to comparatively unimportant points that may nevertheless be worth locating approximately, may be had up to a maximum limit of 3,000 ft. by including the whole rod between the middle and one extreme wire. Indeed, on such preliminary reconnoissance as is to be made over a considerable portion of China for the new lines, readings of 2,000 ft. to a half mile may be regularly taken whenever the topography, growth and atmosphere will permit, with all the precision necessary for such work. The country is such that rapid traveling, even on horseback, is impossible for a good part of the road to be traveled, and the stadia method can be handled to give a string of distances and elevations almost as rapidly as a man can walk. The information obtained will be practically absolute, definite, and reliable, the elevations subject to none of the uncertainties of barometric work, and the distances to none of the errors due to scaling from maps or estimating speed of travel.

But the field methods used are, perhaps, of minor importance, for, after all, if the proper route be missed, all the economy and precision possible in field methods will avail absolutely nothing. It may be said, however, that the transit and stadia method, permitting the general characteristics of the several possible routes to be determined at such little cost and so correctly, should render less likely the selection of the wrong route through failure to examine all routes. In the next article will be taken up those considerations that determine the selection of both the general route and the detail location.



Plan of New Passenger Station and Tracks at Pittsburgh, Pa.—Pennsylvania Railroad.

New Pennsylvania Passenger Station at Pittsburgh.

The Pennsylvania Railroad is about to carry out the plans which have long been under consideration for a new passenger station at Pittsburgh, and for the elevation of the tracks approaching it from the west, in order to do away with the grade crossings at Liberty avenue, Penn avenue and Eleventh street. The general outline of the new station, with the location of the tracks, is shown in the accompanying drawing, Fig. 1. The trains of the Pennsylvania Railroad proper (from the east and those of the Allegheny Valley) arrive on and depart from the tracks a, b, c, d and e, in the train shed, at the right of the drawing. The tracks of the Pittsburgh, Fort Wayne & Chicago are shown at A. These now cross Liberty and Eleventh streets at grade. The tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis come in at B. These, and the tracks from the east, are also to be raised, and the whole station and train shed will be about 16 ft. above the present level. Pedestrians and carriages coming to the station from the city will reach the main entrance over practically the same route as at present. The engraving, Fig. 2, made from the architect's sketch, shows the general appearance of the building which is to be erected. The approach from Liberty avenue is an easy slope.

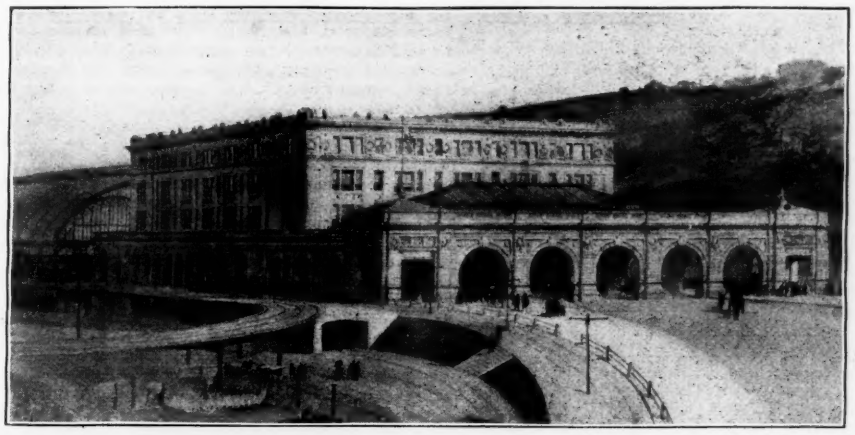


Fig. 2.—New Union Passenger Station at Pittsburgh, Pa.

Interlocking At Greensburg, Ind.*

The Chicago Division of the Cleveland, Cincinnati, Chicago & St. Louis (the "Big Four"), crosses the Michigan Division at Greensburg, Ind. This crossing, with the extensive yard tracks and "Y" connection, together with the location of the signals, derails, switches, etc., is shown in the accompanying diagram, Fig. 1. It will be noticed that the location of the signal cabin is at a considerable distance west from the Y connections, the furthest derail (No. 48) being 2,815 ft. east of the cabin.

The drawing is not made to scale. The length of the portion of the Chicago division tracks cut out from the center of the diagram is indicated by the distance from signal 34 to signal 38 (850 ft.) The parts of the Y cut out are indicated by the letters A and B. From signal 59 to signal 60 the distance is 600 feet. Signal No. 36 is 370 ft. west from switch No. 43, and the distance from No. 43 to the derail (No. 42) is 320 ft. That part of the diagram containing switches 8, 13, 18, 20, 21, 23, 25, 26 and 28 is shown on a larger scale, immediately above the main diagram.

The great distance at which switches and signals are worked, and the situation of the tracks, makes it necessary for the floor of the signal cabin to be elevated about 32 ft. above the rail, so that the operator may have a clear view of all points. Believing that such a cabin, built in the ordinary style, would be unsightly, and as it would be a considerable obstruction to the view of the trainmen, the National Switch and Signal Company of Easton, Pa., which installed the signal work at this point, offered an original design for the cabin which is illustrated in Fig. 2. No attempt has been made at ornamentation, but it is believed that the simplicity of the design and the carefulness with which each detail has been worked out will commend the cabin to those seeking a style which will give permanent satisfaction. The windows are all made to slide horizontally, and there is a hand rail on both sides of the cabin, so that the operator may lean out without danger. The sills of the windows are very close to the floor on which the operator stands, so that he may have a view of the tracks close to the cabin without the necessity of opening the windows.

The machine in this cabin is the National '97 Model, having 57 active levers, and three blank spaces for the operation of 28 switches, six movable point frogs, 34 facing point locks and 30 signals. One of the blank spaces is occupied by a floor beam extending through the machine for the purpose of binding the cabin together and allowing the operator to step through the machine, thus avoiding the necessity of going around the ends when the levers are in their normal position.

The National Switch and Signal Company advocates the use of iron posts for signals, and iron foundations for all ground work supporting the connections, and at Greensburg the company had opportunity to carry out all its suggestions of this kind. The railroad company has found that signal

* See also note on page 880.

posts put in but a few years since were causing trouble and expense by decaying at the point of contact with the earth; and foundations put together by the old plan, of dovetailing the cap into the sides, have crumbled, the exposed portion forming a receptacle for holding moisture, which naturally causes decay. Fig. 3 shows a two-arm signal at Greensburg, with two others in the distance. The

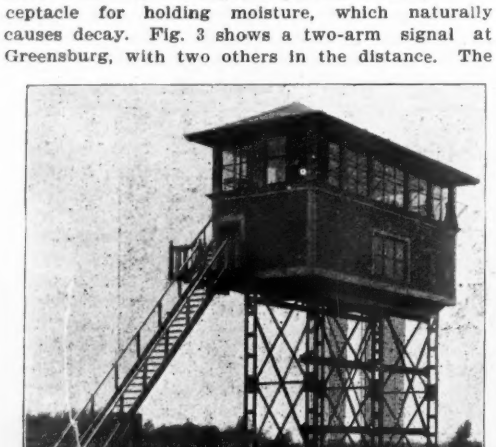
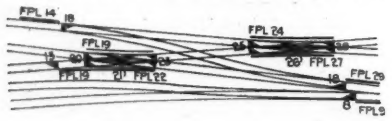
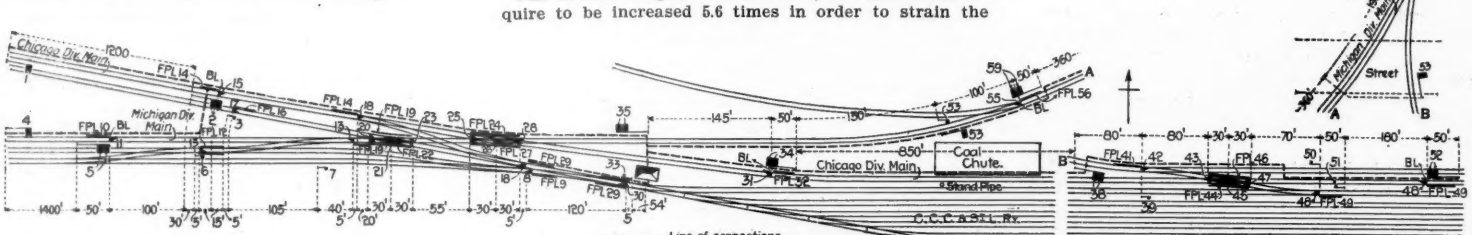


Fig. 2.—Signal Cabin at Greensburg, Ind.—C. C. C. & St. L. Ry.

signal arms appear rather more prominent than if the pole was of larger diameter. The iron post is set in concrete. Experience may show that the expense of concrete can be avoided.

All bell cranks, wheels and compensators are supported on National standard iron foundations imbedded in concrete. Fig. 4 illustrates the manner of attaching the wheels to the iron piers. Bell cranks and compensators are attached in the same way. The purpose of the slotted head in the iron pier is two-fold. First, it provides for any future elevation





Note: None but shaded switches worked from Tower.

Fig. 1.—Switches and Signals at Greensburg, Indiana—Cleveland, Cincinnati, Chicago & St. Louis Railway.

of the tracks; all that is necessary in order to raise the mechanism to correspond with the elevation of the track is to withdraw the bolts and put in new bolts to correspond with the added height, an oak cap being placed on top of the pier for carrying the concrete up to the new elevation required. Second, the slot is valuable in reducing the time and labor necessary to adjust the bell crank, wheel or compensator, for it is only necessary to fix the piers accurately in one direction, the bolts being movable in the slot transversely after the piers are fixed. This secures accurate alignment at the minimum cost of installation. Perspective views of these iron foundations were shown in the Railroad Gazette, Dec. 17, 1897, page 888.

The pipe carrier foundations are formed of a single iron pier where the number of lines of pipe does not exceed three. An oak cap is bolted to the top of the pipe carrier as illustrated in Fig. 5, and when a greater number than three lines of pipe are carried two piers are used, placing one under each end of the oak cap. No concrete is used with the pipe carrier piers.

The long distances at which switches and signals are worked at Greensburg may be appreciated by considering the amount of pipe and wire used in the installation, there being 28,400 ft. of pipe and 46,250 ft. of wire. There are in the machine 360 locking dogs and 458 ft. of locking bar.

New York & Brooklyn Bridge.

Mr. C. C. Martin, Chief Engineer and Superintendent of the New York & Brooklyn Bridge, has made to the Commissioners the following report. It was made public last Saturday:

In response to your request, I beg leave to make the following report on various matters connected with the bridge:

First. As to its strength and safety. The loads on the bridge at present are made up as follows: Bridge cars—The trains are made up of four cars—a motor car, which, fully loaded, weighs 44 tons; three passenger coaches, fully loaded weighing 28 tons each—84 tons. Total weight of a train, 128 tons. This equals 256,000 pounds.

The trains run at 11⅗ miles per hour, and if they run on 45 seconds' headway they will be 748 feet apart from front to front. Hence the above load will be distributed over 748 feet, giving a load per lineal foot, for both tracks, of 690 pounds. The trolley cars loaded weigh each 14 tons, or 28,000 pounds, and are spaced 102 feet apart; hence this load, per lineal foot, is, for both roadways, 550 pounds. The load on the carriage ways is taken to be two continuous lines of trucks (one on each roadway), each truck occupying twenty feet and weighing 2.75 tons, 5½ tons on both roadways, or 11,000 pounds; hence the load from this source is, per lineal foot, 550 pounds. The load on the promenade is taken at 50 pounds per square foot (although Mr. John A. Roebling says in his original report of 1870 that 30 pounds per square foot is a maximum load of a moving mass of people). Since the promenade is 15 feet wide, the load due to this source is, per lineal foot, 750 pounds. Total moving load per lineal foot, 2,540 pounds.

The length of the main span of the bridge, in the clear, between towers, is 1,545 feet; hence total moving load is 3,924,000 pounds, or 1,962 tons. In 1892 the actual weight of the bridge superstructure was computed for the use of the board of experts which was appointed to advise upon the introduction of the trolley cars upon the bridge, and it was found to be, including cables and suspenders, 5,828 tons. The additional dead load that had been added from time to time is as follows: Additional new tracks for bridge railway, additional hauling cables, trolley arms, telegraph and telephone wires and cables and supporting sheaves, electric feed wires and cables, trolley tracks and mail tubes, 430 tons. Total dead weight and moving load, 8,220 tons.

To obtain the strain in the cable produced by this load this weight must be multiplied by 1.7; the strain is thus found to be 13,974 tons. The ultimate strength of each cable is 12,300 tons, or the ultimate strength of the four cables is 49,200 tons. Divide this amount by the strain in the cable—49,200÷13,794—and the factor of safety is found to be 3.52.

That is to say that the whole strain, which is now 13,974 tons, must be increased by 35,226 tons to produce the strain of 49,200 tons, which is required to break the cables. Now, since the weight of the structure cannot be materially increased, the increase, if it comes at all, must come from the moving load; and since that is 1,962 tons, it follows that the moving load must be increased the number of times found by dividing 35,226 by 1,962x1.7, which is 10½, before the limit of the strength of the cables is reached.

The elastic limit of the cables is ⅜ of the breaking strain, or 49,200 multiplied by ⅜, which is 32,800 tons.

The total moving load is 1,962 tons, and this would require to be increased 5.6 times in order to strain the cables even to their elastic limit, to which point the metal of the cables may be strained without injury.

With regard to the safety of the anchorages it is only necessary to say that, during the first few years of the use of the bridge, both anchorages moved forward at the top about ⅝ of an inch, but there was no movement at the bottom. This movement was due, without doubt, to the compression or settling together of the timbers under the toe of the masonry of the anchorages. During the last eight years this movement has been about ⅛ of an inch at each anchorage, so that any strains that have been brought upon them up to this time have produced no injurious effect whatever, and it is not proposed to materially increase the loads on the bridge.

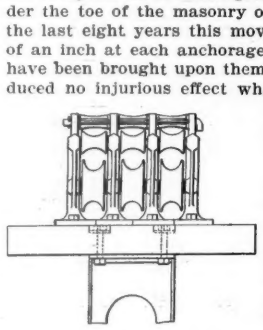


Fig. 5.—Foundation for Pipe Carrier.

With regard to the eight saddles, careful measurements have been made from time to time, and the results show that within a year from the time the bridge was opened to public use they had all moved toward the river about four inches. In the 14 years from 1884 to 1898 they had moved from 1 inch to 1¼ inches additional. There is nothing in this movement but what is normal and proper.

In July last, when the outrageously unbalanced loading occurred, the saddles moved toward the river from half an inch on some to two and a half inches on others. Those which moved forward at that time are all returning to their normal positions.

With regard to the movement of elevated railroad trains on the bridge, I would say that the original schedule upon which they were run was approved by this department, and no change has since been made without proper sanction, and every direction from this office has been cheerfully carried out.

With regard to the trolley cars, soon after they entered upon the bridge a tendency was developed to run the cars nearer together than the 102 feet limit that had been fixed as the distance apart they should run. Without delay the attention of the executive head of the associated trolley companies was called to the matter, and he at once increased the number of inspectors to five on each roadway, and that number were on duty when the buckling took place on July 29. How they came to allow the cars to run so close together as to form a continuous solid line from the point at which the obstruction occurred, near the Brooklyn tower, over the entire structure to the New York station, I cannot tell, unless their instructions were that they should not run closer to each other than 102 feet, and that they assumed that they might stand in solid line. Be that as it

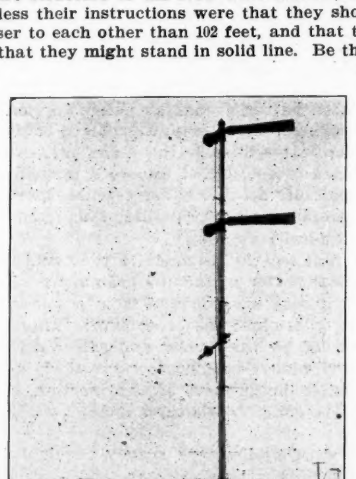


Fig. 3.—Semaphores with Iron Posts.

may, the bunching of the cars and the consequent buckling of the lower chord of some of the bridge trusses occurred. This did not in the slightest degree affect the strength or safety of the bridge.

In order to absolutely prevent the reoccurrence of such a condition of loading on the bridge, instructions were at once given to the inspectors that the cars were not to be allowed to approach each other nearer than 102 feet. In addition, upon your request, the policemen on the bridge were instructed by the Police Department to aid in enforcing the rule for the trolley cars, and also to prevent bunching of teams on the bridge in case of blockades. I have not the slightest fear that any serious unbalancing of the loads on the bridge will hereafter occur.

In conclusion, I beg to say that, in my judgment, the bridge is as safe to-day as it ever was, and that is equivalent to saying that it is absolutely safe; that no one need entertain for a moment any fears of its stability. The most careful inspection and supervision by this department of everything pertaining to the bridge has never been relaxed, and will not be. It affords me

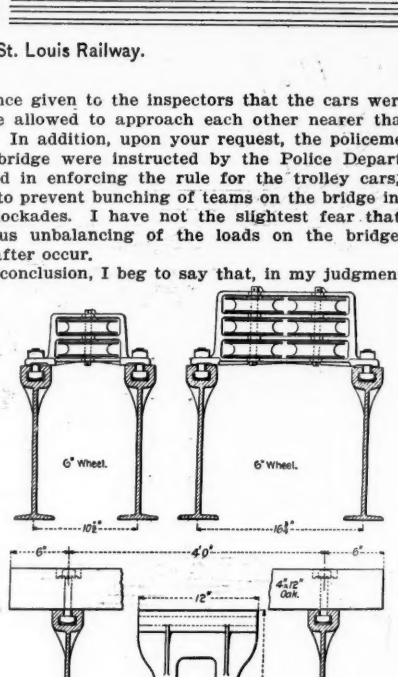


Fig. 4.—Foundations for Wheels, Compensators, Cranks and Dwarf Signals.

pleasure to say that the authorities of both the elevated and trolley companies have been more than willing to carry out any directions or suggestions from this office, and the Police Department of the city has cheerfully responded to every request for assistance.

Design and Strength of Suspension Bridges.

In an article on "The Suspension Bridge; Old and New," in the December issue of the Engineering Magazine, Mr. Gustav Lindenthal brings out many facts about the early designs of suspension bridges, and gives some information about recent and proposed structures. He tells how the North River bridge will be built with such an air of confidence that the reader expects soon to hear of its completion. It is his reference to the New York & Brooklyn Bridge, however, that is of particular interest just now, and it may be observed that the following extract from the article in question is in keeping with the tenor of the recent discussions in the Railroad Gazette:

Analysis of the characteristics of a suspension bridge shows that its strength depends upon three principal elements—the cables, the towers, and the anchorages. Provided these three be strong enough, the suspension bridge is safe, though it may sway or oscillate. No other bridge can sway from any cause without imminent danger.

Theoretically, the suspended arch of a cable is in all respects equal in resisting force to the erect curve of an arch bridge. If the erect arch can be made rigid, so can the suspended arch be, and by the same methods. In the suspension bridge the arch is in tension, which must be resisted by anchorages; in the arch bridge the erect curve is in compression, which must be resisted by abutments. But the suspended arch has the exclusive advantage of being in stable equilibrium; it requires no lateral bracing to maintain it in position, whereas the erect arch is in unstable equilibrium, and, if not held up by vertical and lateral bracing, must collapse. Hence the greater stability and safety of the suspension bridge. It is, in fact, of all known systems the most stable and safe. In any other form of bridge, if a single supporting member be displaced or ruptured, collapse of the entire structure is the almost inevitable result. The suspension bridge, on the other hand, need not be rigid, in order to be safe. It can be designed at will of any degree of stiffness, from the mobility of a wash line to the rigidity of a stone arch, save for slow changes of form caused by changing temperature. In a suspension bridge the quality of rigidity is a convenience; in all other bridge systems it is a necessity. A recent occurrence on the Brooklyn bridge demonstrated this distinctive feature. The crowding of several heavily loaded street cars on the main span overstrained the stiffening trusses in a manner perfectly intelligible and foreseen by bridge engineers. The chords gave way by buckling. The public became unnecessarily alarmed as to the safety of the bridge, which was not affected by the failure of the stiffening trusses. The bridge is designed for street traffic only, which is always more or less distributed over the entire length of the roadway, and crowding can be avoided by police regulations. If the structure had been intended for railroad traffic, or for concentrated loads, it would have had to be designed differently. Modern American railroad structures must, for instance, be able to sustain with perfect safety the load of locomotives, weighing 100 tons on a wheel base of 15 ft. If such a locomotive attempted to cross the Brooklyn bridge, it would wreck the metal floor and trusses from end to end, but the safety of the cables, towers, and anchorages would remain unimpaired. Similarly, in the old Niagara bridge, the stiffening trusses were repeatedly overstrained, and the steel chords several times broken from the excessive load of modern locomotives and trains. Nevertheless, the traffic could be kept up with safety; the trains could not drop into the abyss because again the cables, towers, and anchorages were strong enough and safe. If a similar buckling or breakage of bridge frame should happen on a cantilever, arch bridge, or truss bridge, then bridge, train and all would go down without fail. And thus it is that, because a suspension bridge can safely exist without the amount of bracing which every other kind of bridge requires, it can be built lighter, as far as the superstructure is concerned. Thus the Brooklyn bridge, which has a middle span of 1,600 ft., and flanking spans of 920 ft. each, has an average dead load per lineal foot of 7,500 lbs., of which the weight of iron and steel is 6,200 lbs. It carries four rapid-transit tracks, two roadways and a promenade, and is proportioned for a moving load of 2,000 lbs. per lineal foot. With the same weight of metal (6,200 lbs. per lineal foot) it is impossible to build any other kind of bridge of the same width (85 ft.), the same length of spans, and the same carrying capacity.

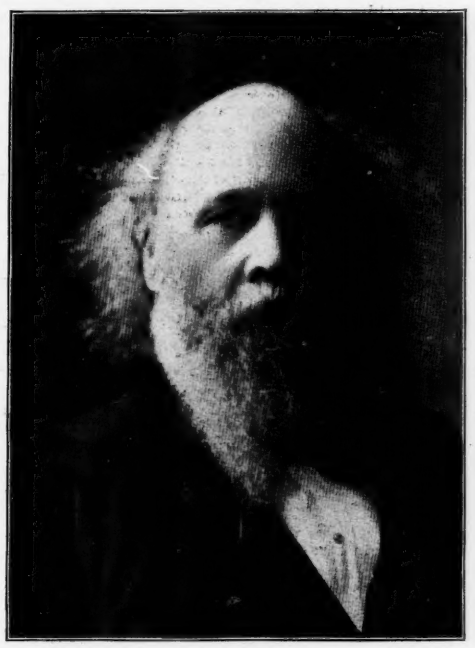
George Wallace Melville.

Commodore Melville, who last week was elected President of the American Society of Mechanical Engineers, was born on Jan. 10, 1841, in the city of New York. While thus American by birth, he springs from a family whose seat is at Stirling, in Scotland, and which held, for centuries, an honored place in Scottish history. In view of the naval and Arctic record of the Engineer-in-Chief, it is interesting to note that, but two generations from him, we find, in his ancestry, Sir James Melville, who was First Lord of the Admiralty when the expedition of Parry, by Baffin's Bay, was dispatched, and whose name has been given, through this, to some Arctic lands and waters. In 1804 James Melville of Stirling landed in the United States, bringing with him a large family of stalwart sons, one of whom, Alexander, was sent again across the sea to complete his education at the old University of St. Andrew's. Later, as "Big Sandy," he was widely known in New York, as widely popular, and a power in the politics of his day. He married Sarah Doupher Wallace, and became the father of George Wallace Melville.

The lad received his early training in the public schools of New York City; and, later, displaying marked mechanical instincts, he passed through the Polytechnic School of Brooklyn, was given a further course in mathematics at a religious academy of that city, and was entered finally in the engineering works of James Binns, of East Brooklyn, where Melville laid, broadly and deeply, the foundations of that practical skill with which he has served his country so notably in his subsequent career.

The outbreak of the civil war found the future Engineer-in-Chief in the dawn of manhood, feeling to the full not only the devotion of a strong nature to the land of his birth, but, as well, the pulse and throb of the stern race from which he sprung, whose martial pipes have sounded above so many battle fields, from Bonnockburn to the heights of the Dargai Ridge. His training, with an inborn love of adventure, turned him toward engineering duty and to the sea, and, on July 29, 1861, when but twenty years and six months old, and but ninety days after the war began, he became an officer of the Engineer Corps of the United States Navy.

Although but a junior officer during this war, Melville saw much active service, cruising first on the northern lakes, then with the North Atlantic fleet at the capture of Norfolk, the burning of the Merrimac, the long engagement at Fort Darling, and in covering the retreat of McClellan's army to Harrison's Landing. Later he joined the Dakotah, which carried dispatches to Farragut after the Admiral's brilliant passage of Forts Jackson and St. Philip. Still later, he was with the Wachusett in the cutting out of the Confederate cruiser Florida in the harbor of Bahia, Brazil; served on Torpedo-boat No. 6 at the capture of Fort Fisher, and, finally, was on the gunboat Maumee when that little craft cut



George Wallace Melville.

and rammed her way up the James River to the neighborhood of Richmond, while the Confederate capital was still burning, on the day of its evacuation.

Melville's exploits in Bahia Bay are of a kind with those of Hobson in Santiago harbor.

The Wachusett and the Florida lay but about half a mile from each other, under the guns of Brazilian forts and war vessels. The capture within the marine league was a gross violation of international law, to which only the unfair conduct of neutrals, during the war, could give the semblance of right. At a council, Melville advocated attack by ramming. It was contended, as to this, that the blow would start the Wachusett's boilers, break seam joints, and scald fatally all below. Melville's reply was characteristic: "I do not think so; but I will order all hands on deck and work the engines alone." Again—although running the danger of death as a spy—the young engineer, in open daylight, boarded the Florida, in civilian's dress, and learned the strength of her battery and the location of her machinery, before he was hustled over the side with the threat that a shot would be dropped through his boat, leaving him to sink or swim in the bay. The midnight attack on the Florida and her capture by ramming are dramatic incidents of history, in which, it will be seen, the Engineer-in-Chief, then but a lad, played a leading part.

Passing over Melville's routine service, during years of peace, in the Navy, we find him, in 1873, on board the Tigress, as she breasted the fierce autumnal gales of the Arctic in search of the crushed and stranded Polaris. Six years later, with the ice-hunger fully on him, he passed, in the Jeannette, again into the White North on an expedition which was to be marked by heroism as lofty as its suffering was deep. Leaving San Francisco in July, 1879, the ship steered through Behring's Strait, and, meeting the ice early in September, she never thereafter escaped from the floe which held her; but, drifting steadily to the westward for nearly two years, she was crushed and sunk June 12, 1881, leaving her crew shelterless on the ice-floe in mid-ocean.

After many days of retreat the ship's company reached the edge of the ice and separated into three boats' crews, Melville commanding one of these. In the gale which followed one boat and her men were lost; the others reached the Lena Delta at widely distant points. Their crews were in most pitiable condition. Feeble, ragged and starving, in about 100 days and transporting 290 pounds for each man, they had completed an unparalleled retreat, aggregating, in its many windings, over 2,200 miles. The death, later, of De Long and his men forms one of the saddest pages in all Arctic history, as the subsequent search for them by Melville, in its daring and endurance, makes one of the most noble examples of devotion and self-sacrifice that the North has ever known.

Commodore Melville has been the Engineer-in-Chief of the United States Navy since August 9, 1887. The creation of our modern fleet was most ably begun under his immediate predecessor, Commodore Charles H. Loring, U. S. Navy, now President of the Engineers' Club of New York. Succeeding this distinguished officer, the present Engineer-in-Chief has supervised the designs of the machinery of all of the war vessels which now compose our fleet, excepting those of three ships, plans for which were purchased abroad; those of three or four others bought outright just previous to the war with Spain, and those of four vessels designed under his predecessor. From the beginning of the modern navy, the machinery of our vessels has been markedly successful, owing to the wise mixture of progress and conservatism which has governed their design. Thus, triple screws were, for vessels of great displacement, largely untried when Commodore Melville, staking his reputation as an engineer on the result, designed the Columbia and Minneapolis. The unprecedented records of these ships, both in trial runs and in long-distance steaming, have vindicated fully his judgment in this matter, and at the present time, despite previous adverse criticism of this type, there are laid down or building for foreign navies 45 triple-screw ships, aggregating in displacement 401,913 tons. On the other hand, our ships, as compared with foreign competitors, have been notably successful in trial trips, when pushed to extreme speed. The leading element of this success has been the strenuous insistence of the Engineer-in-Chief on large boiler power, ample bearing surfaces, etc. The pressure to reduce all weights to a minimum in warship design has caused no swerving from this policy of wise conservatism. As a high naval official, commenting on this, recently said: "Melville has always an extra knot up his sleeve." To this unchanging course, combined with good workmanship and able handling—although without the first the other elements would have been useless—are due the magnificent run of the Oregon of over 14,500 miles, stopping only for coal, and, as well, what Admiral Sampson described as her "amazing speed" in the race after Cervera's fleet. It may be noted here that Commodore Melville is, without doubt, the leading advocate of high speed among the warship designers of the world. Without losing sight of other essential qualities, he has borne steadily in mind the value of the "weather-gage" in modern naval war, the power to choose the battle-ground, and, at will, to force the fighting. To him more than to any other one man is due the decision of the Navy Department—after months of discussion—that our new battleships shall have 18 knots' speed, that they shall stand on a par as to this with the latest vessels of foreign fleets.

In the war with Spain, the United States, the last of the great powers to construct a modern fleet, was fated to be the first to test that fleet in battle. The Engineer-in-Chief met the issue with characteristic energy and resourceful ability. The repair-ship Vulcan, the first of her type in active service, has proved an unqualified success. She maintained intact a fleet off Santiago which would otherwise have been partially scattered to dockyards for repairs. The distilling ships, although completed too late for active service, have won a place for their type among the auxiliaries of a modern fleet, supplementing, as they do, the warships' evaporators and the reserve stock of fresh water in tanks. A noteworthy engineering feat was performed when, in 30 days, the worn out boilers of three monitors were removed and replaced by those of tubular type, without disturbing the decks. When it is remembered that these were each but single items in the war-work of his bureau; that, in addition, a great fleet was supplied and kept efficient, navy yards were run night and day, and a number of new designs made for proposed vessels, the magnitude of the labor and responsibility of the Engineer-in-Chief may, in some degree, be measured.

In the course of a long and distinguished career, Commodore Melville has been the recipient of many honors. In his homeward journey from the Lena

Delta he was granted a private audience by the Czar and Czarina of Russia; and, later, was received by the officials of, and given public receptions in the cities of New York, Philadelphia and Washington. He was elected a member of the National Geographical Society of the United States, an honorary member of the Royal Swedish Society of Anthropology and Geography, a member of the Geographical Society of Philadelphia, and of the American Philosophical Society. Subsequently, he was made an honorary member of the Institution of Naval Architects of Great Britain, and he became gold medallist, by act of Congress of the United States, for heroic services in the Arctic. In 1896, the Stevens Institute of Technology conferred upon him the degree of Doctor of Engineering. In the War Museum of the Loyal Legion at Philadelphia, that body has placed a noble bust in bronze of the explorer and engineer. The American Society of Mechanical Engineers has recently elected him its President. The nation is fortunate, indeed, that, in the rehabilitation of its fleet and in the stress of sudden war, it has been able to command the services of such a man as Commodore Melville.

W. L. C.

American Society of Mechanical Engineers.

Last week we gave extracts from the annual address of the President, a list of the newly elected officers and abstracts of two of the papers. A number of reports came before the society at the business session Wednesday morning. The first of these, the report of the Council, showed a total membership of 1,881. To this has been added by recent election 21 members, 4 associates and 14 juniors. The following amendment, recommended by the Council, was then adopted:

Applications for membership from engineers who are not resident in the United States and Canada, and who may be so situated as not to be personally known to five members of the society, as required in the foregoing paragraph, may be recommended for ballot by five members of the Council, after sufficient evidence has been secured which shall show that, in their opinion, the applicant is worthy of admission to the grade which he seeks.

Mr. Gus. C. Henning gave a report for the International Association for the Testing of Materials, stating that so far the work had been largely in the line of thoroughly organizing the American section, of which the American society as a body had been elected a member.

The next report was from Mr. Kent, Chairman of the committee appointed on the Revision of the 1895 Code for Conducting Boiler Trials. In the discussion of this report, the question was raised as to the necessity of a standard and an alternate method of testing. Professor Hutton suggested that blanks be included for metric units, in order that the code might be used equally well abroad. Mr. Kent stated that the question of the alternate method had been thoroughly discussed, and probably no change would be made. The report, however, was open to modifications on any point that should be changed, and suggestions would be considered.

The Committee on the Unification of the Methods of Testing Steam Engines was represented by Professor D. S. Jacobus. This committee consists of Messrs. Frank H. Boyer, George H. Barrus, Bryan Donkin, George H. Richmond and D. S. Jacobus. Mr. Donkin represents also and is working in conjunction with a similar committee appointed by the Institution of Mechanical Engineers. In his report, Prof. Jacobus stated that the general plans had been outlined, in which it was suggested among other things to provide two tables, the first for a rough or general test and the second for a scientific test, one that would include all the analyses of a refined nature. Mr. Donkin had suggested that the tables be made for locomotives, pumping engines and other engines, but the committee felt constrained to confine its work to stationary engines. After the announcement of the officers for the ensuing year, as given in our last issue, Commodore Melville briefly expressed his appreciation of the honor conferred and Messrs. Geo. C. Henning and Daniel Ashworth in well chosen words spoke of the value of the work of the President-elect as Chief Engineer of the Navy, of his broad sympathy and his great worth as a man. Elsewhere in this issue will be found a carefully prepared sketch of his life.

Mr. Kent raised an interesting discussion by suggesting that the Publication Committee be enlarged to seven members and that no paper be presented to the Society until it had the written approval of three members of that committee. He thought the committee had been lenient at times. Messrs. Wm. H. Wiley, Gus Henning and H. de B. Parsons explained the work of the committee and referred to the difficulty in obtaining the class of papers that were the most desirable. Mr. Kent's subsequent remarks made it plain that he did not object so much to the presentation of papers before the society of a doubtful scientific or engineering value, but rather desired to purge the transactions of such papers as could not be classed as sound engineering literature.

A resolution was passed to refer to the Council the suggestion that means be taken to encourage the younger members of the Society to discuss matters of engineering interest.

The professional paper on the strength of wheel rims was then taken up. This was printed nearly in full last week.

In discussing Mr. Mansfield's paper, Mr. Supplee quoted the paragraph from Reuleux previous to one given on the paper, which puts another light on the remarks of Reuleux. Professor Jacobus stated for Professor Denton that by changing the sections as given in the paper, the ribs made the wheel stiffer.

Prof. C. H. Benjamin's paper on "The Bursting of Small Cast-Iron Fly-Wheels" was then taken up. The following are the author's conclusions:

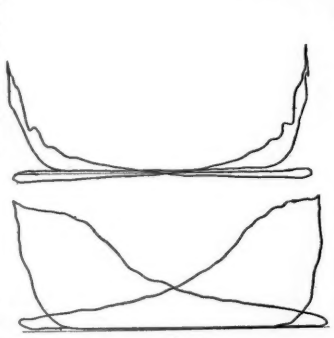


Fig. 6.

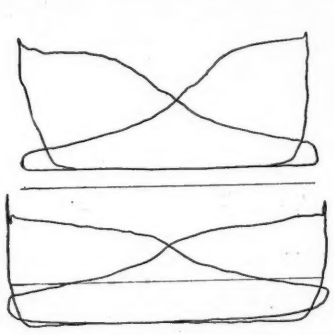


Fig. 7.

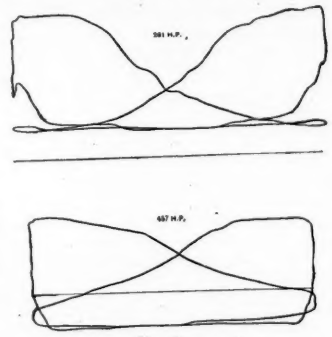


Fig. 8.

Fly-wheels with solid rims, of the proportions usual among engine builders and having the usual number of arms, have a sufficient factor of safety at a rim speed of 100 ft. per second, if the iron is of good quality and there are no serious cooling strains. In such wheels the bending due to centrifugal force is slight, and may safely be disregarded.

Rim joints midway between the arms are a serious defect and reduce the factor of safety very materially. Such joints are as serious mistakes in design as would be a joint in the middle of a girder under a heavy load.

Joints made in the ordinary manner, with internal flanges and bolts, are probably the worst that could be devised for this purpose. Under the most favorable circumstances they have only about one-fourth the strength of the solid rim and are particularly weak against bending. In several joints of this character, on large fly-wheels, calculation has shown a strength less than one-fifth that of the rim.

The type of joint with the link connection is probably the best that could be devised for narrow-rimmed wheels not intended to carry belts, and possesses when properly designed a strength about two-thirds that of the solid rim.

In the discussion of Professor Benjamin's paper, Mr. A. A. Carey pointed out that fly-wheels burst more frequently in electric light plants than elsewhere, the conditions there being particularly favorable to accidents. In a record of 67 wheels that broke, 19 were in electric generating stations. Mr. John Fritz stated that not one of his wheels had burst. Early in the building of the wheels some departures were made from established methods. This consisted principally in casting the rims hollow, but giving them considerable mass, thus giving rigidity, which element of strength was emphasized by Mr. Henning, who also pointed out that cast-iron was three times as elastic as steel and two and one-half times as elastic as wrought iron. It was also pointed out that the Fritz wheels, while answering every requirement, were more expensive to make. Consequently a company that attempted to make these might not be able to compete with other firms that had their standards and could supply them quickly and at a less cost.

On Wednesday evening President and Mrs. Hunt and Secretary Hutton received the guests at Sherry's, where a delightful evening was enjoyed.

Thursday.

The first paper taken up on Thursday morning was on the "Theory of the Moment of Inertia," by Prof. C. V. Kerr. Reference was made to this last week. The paper was criticised by Mr. Kent, he believing that the author was in error in many points.

The paper by Mr. W. B. Le Van on "Improvements in Steam Boilers" was also the subject of criticism and disapproval, and Mr. Kent went so far as to recommend that the Publication Committee withhold this paper. with discussions, from the transactions.

The paper on the "Valve Gear of the Willans Engine," by John Svenson, gave the characteristics of the gear of this engine, which is believed in the language of the author to possess the following advantages:

Minimum number of parts and simplicity of form and construction; a free inlet and release, and a cut-off so sharp as to rival even a Corliss; a balanced valve of the piston type, with very small clearance spaces, and which by virtue of its position is easily kept steam tight; great facility for varying the cut-off; perfect adaptability to the difficulties of high rotative speed.

Those interested will find a full description in the paper.

The next paper was by Mr. R. Van A. Norris, his subject being "The Generation and Utilization of Steam by the Lykens Valley Coal Co., Dauphin Co., Pa." The paper gives the results of somewhat careful tests of this plant in the coal regions, where the price of coal was incidental to the other costs. His tests were not as refined as the author of the paper would have wished, but gave some instructive results.

In the discussion, fan and steam draft were compared, to the disadvantage of the latter. Compounding was also shown to effect a saving of as much as ½ at times over the simple engine.

The paper entitled "Cooling Tower and Condensing Installation," by J. H. Vail, was then read.

This paper shows conclusively the advantages in the introduction of a cooling tower and describes some changes in the arrangement of a power plant, resulting in the increased capacity of about 1,000 h. p. with the aid of a condensing system. No addition was required to the boiler plant, although a large gain of power was effected. Fig. 6 shows a set of specimen indicator cards taken before the alterations. A few conditions at the time of taking these cards should be noted:

Average temperature boiler feed, 206.5; duration of test, five hours; grate surface, 43 sq. ft.; average steam pressure, 97.4 lbs.; average temperature, boiler room, 69°; average temperature stack gases, 440°; coal fired, 6,280 lbs.; weight of ashes, 892 lbs.; weight of combustible, 5,388 lbs.; water evaporated, 704.6 cu. ft., 42,818 lbs.; water evaporated per lb. of coal from and at 212°, 7.13 lbs.; water evaporated per lb. combustible from and at 212°, 8.24 lbs.; coal burned per sq. ft. of grate per hour, 29.2 lbs.

After the data from the tests had been analyzed, Mr. Vail recommended that the Buckeye engine should be changed from the 18½x30 high pressure engine into a 14¼ and 25x30 tandem compound condensing engine. Also that an additional 750 h. p. tandem compound condensing engine should be put in the station, together with the cooling tower and the necessary condenser equipment, and that the only change in boilers will be to raise the working pressure. The Barnard cooling tower was selected. This is of the twin type, having two chambers with a pair of fans supplying a strong draught of air to each chamber. The interior height of the tower is 29 ft. 6 in. Fig. 7 shows specimen cards taken from this engine in daily service since the alterations were made. It will be noted that the work is divided almost equally between the high pressure and low pressure cylinders. All cards show similar results. The following data will make these cards more intelligible: Revolutions, 137; steam pressure, 113 lbs.; mean effective pressure, 50.16 lbs.; vacuum per gage, 26 in.; h. p. developed in high pressure cylinder, 163.42; h. p. developed in low pressure cylinder, 168.48; total, 331.9 h. p., and of this 90.52 h. p. is below atmospheric line.

This change is an existing engine clearly illustrates the advantage derived from the condensing system. This engine was fitted with a receiver and reheater between high and low pressure cylinders; several tests have been made and representative cards were analyzed to determine whether the reheater is of value, and as a result of these tests it was found that the reheater condensation amounts to 63 lbs. of steam for each horse-power gained in the low pressure cylinder. It was therefore abandoned as an expensive luxury.

In addition to the tandem Buckeye engine a tandem compound condensing engine, 20 in. and 36 in. x 42 in., 120 revolutions per minute, Corliss type, built by Pennsylvania Iron Works, was installed to drive a direct connected Stanley 500 kw. two-phase A. C. generator. This engine works 15 to 17 hours per day. Specimen indicator diagrams are shown in Fig. 8, which shows the advantage of the condenser service.

The paper by Prof. Jacobus, printed in abstract in this, or to appear in a subsequent issue, was then read. This was followed by a consideration of Variation of Belt Tensions with Power Transmitted, by W. S. Aldrich.

In this paper the author discusses the conditions of the effect of a laced tension and a constant lineal speed when the load is increased. He has been led to the following conclusions:

That, with a given initial or laced tension and a constant lineal speed, when the load is increased:

(1) The tension on the tight side of the belt increases much more rapidly than the tension on the slack side decreases.

(2) The working tension ($T_1 - T_2$) increases more rapidly than the sum ($T_1 + T_2$) of the tension on the tight and slack sides.

(3) The working tension ($T_1 - T_2$) tends continually to approach the value of the sum ($T_1 + T_2$) of the tensions,

as the load is increased indefinitely as far as the breaking strength of the belt.

(4) The ratio of the tensions of a belt transmitting power cannot be calculated with any degree of accuracy by means of the well-known belt formula $\left(\frac{T_1}{T_2} = e^{f\theta}\right)$ involving the arc of contact and the coefficient of friction.

(5) There is a definite relation between the ratio of the belt tensions and the ratio of their sums and difference, which relation is independent of the coefficient of friction, and may be reduced to the following form:

$$\frac{T}{T_1 - T_2} = e^{\frac{2T_2}{2T_1 - T_2}}.$$

On Thursday afternoon at 2 o'clock, Mr. B. C. Bacheller explained by the aid of lantern slides the Bacheller dispatch system as in use between the main Post Office in New York City and other points. The principal improvement consists of a device which enables the operators to stop a carrier intended for a particular station, while permitting all other carriers for stations beyond to proceed without interruption. At the close of the explanation a very excellent painting of Mr. John Fritz was presented to the Society, and a very fitting address was made by Mr. Robert W. Hunt. After the adjournment of the meeting about 100 members examined the dispatch tubes at the New York Post Office. Mr. Bacheller was present and explained in detail the working of the apparatus.

Friday.

The first paper of the morning was by R. S. Hale and H. J. Williams, on "The Calorific Power of Weathered Coals." The paper gives the results of tests on coal, samples of which were first finely powdered, and the second series of tests was made on lump coal of about nut size.

In a general way, the results show a slight diminution of calorific power in the grades of coal examined, directly traceable to weathering. They also show that where coals have not been exposed to oxidation, by weathering or otherwise, there is a reasonably close agreement between the results calculated by Dulong's formula and those obtained with the bomb calorimeter.

Last of all, they show that when it is desired to compare the respective calorific powers of coals that have been altered to a greater or less extent by oxidation with those of coals that have not been exposed to the weather, the use of Dulong's formula, or any of its modified forms at present in use, as well as the use of Kent's curve, would lead to erroneous conclusions.

The second paper was on "Mechanical Plant of a Modern Commercial Building," by W. H. Bryan. Those interested in this subject will find the subject considered at length in this paper, although objections were taken in the discussion to the method of treating the subject. The discussion, in general, favored the electrical installation for elevators, although their expense was a barrier to their more extended use.

Prof. R. C. Carpenter's paper on the "Experiments on the Flow of Steam Through Pipes" was then read, and in the discussion it was thought that advantage would have been gained had the results been held until more definite and full information could have been given.

Mr. C. L. Newcomb then presented a very full paper on "Hydraulic Hydrants." This was not printed among the advance papers sent out, but will be given in full in the proceedings. This is a subject about which little detailed information of tests has been given.

The queries were then taken up, but the most part called forth but little discussion.

In the discussion of the question on "How Small a Tool Does It Pay to Put an Electric Motor on," Prof. Jackson sent a written discussion, answering the question in the manner in which he discussed it before the Hartford meeting in 1897. In substance, he recommends that tools under five and seven h. p. should be driven by a shafting, which was in turn driven by an electric motor, and all tools above that power should have individual motors. Mr. Halsey stated that at the Baldwin Locomotive Works they do not use motors under five h. p.

The meeting then adjourned to convene at Cincinnati, O., in the spring of 1899.

Improvements in Pneumatic Caissons, Air Locks and Shafts.

Within the past two years Mr. John F. O'Rourke has made a number of important improvements in sinking pneumatic caissons, the main objects in the inventions relating principally to the method of swinging the gates in the air lock and to certain safety devices. To be more specific, his improvements relate to both the caisson shaft and the air lock. In the former of these means were provided in the side wall of the shaft for a series of transverse slots, arranged one above another, as seen in Fig. 2, forming a ladder, thereby affording a means of obtaining access to the air chamber, independent of the bucket, and also providing a means of escape if necessary. Inasmuch as the buckets or cages must be left free to move up and down, it is necessary to provide an unobstructed interior, and leave the walls practically plain, so that nothing can interfere with the movement of the bucket and thereby cause damage or accident. It will be noted therefore that this part of the invention is principally for the purpose of providing a shaft with a ready means of ascent or descent for the workmen. An air seal for the slots, whereby the escape of air from the shaft is prevented, is also included in the invention.

The improvements in the air locks are intended to provide a comparatively simple lock, with gates at the upper and lower ends, which make air tight closures, and also work quickly and with certainty. The most important modification in the recent designs lies in the method of hanging the doors, so as to cause their ready separation by means of a lever and counter-balance, as shown in the accompanying illustrations.

The side elevation, Fig. 2, shows the air lock at the top, below which is the elevator or air shaft, with the ladder, as shown, and at the extreme lower part is the air chamber. The openings, M and N, are, respectively, for the air pipe and the whistle connection, as shown in the engraving, Fig. 1. The other illustrations give the details of the internal arrangement. The different views are so lettered that a reference to any part on one corresponds equally well to the same apparatus, as designated by the same letter in all of the views.

Referring to Figs. 3 and 4, the upper swinging gates, A and A^1, turn about the center, O, being counterweighted by V and W. These are worked by the handle, L, both gates swinging on the centers D and H.

When the upper gates have been moved to the open position, so as to come at rest on the lugs, B and B^1, the buckets can be moved in or out of the air chamber. The meeting edges of these, as well as the lower gates, are packed with rubber tongues, so as to make air tight closures. The lower swinging gates are worked in the same manner, being opened and closed by the lever L^1, and counterweighted by W^1 V^1.

The successive operations are as follows: The bucket is lowered into the air lock, the upper gates being open and the lower ones closed. The upper ones are then closed and air is admitted from the air shaft until the pressure equals the pressure in the air chamber. The lower gates are then opened and the bucket descends into the shaft and finally into the air chamber.

Fig. 5 is a part sectional view showing the roof of the caisson, the levers, counter-weight and other devices. Q is a three-way valve, which serves three purposes: First, it permits air to escape from the air lock; second, it equalizes the pressures in the air chamber and the air lock, and, third, prevents the escape of air from either. It is regulated by means of the contact wheels Y and Z, which in turn are moved by connecting with the handle L by means of a rod not shown in the drawings. When the upper gates are closed the motion of the lever simultaneously closes the air exhaust from the air lock and makes connection with the air chamber below, thus equalizing the pressure in the two chambers. A thumb latch locks these doors in both the open and in the closed positions. The arrangement of the lower swinging gates prevents their movement until the pressures in the upper and lower chambers have been equalized. Air is exhausted from the air lock by a 3-in. pipe, using the same valve shown in Fig. 4.

The air lock is 5 ft. in diameter by 7 ft. in height. The diameter of the caissons used for the dwelling referred to was 6 ft. 7½ in., which is one of the smallest sizes that has yet been built under such difficult conditions, where so much blasting and rock excavation was required.

One of the most important improvements in the construction of the caisson is in the use of wood instead of steel for the outside shell. The lower sectional view, Fig. 2, gives a general notion of the way that the caisson is made. Yellow pine sticks 3½ in. in thickness, about 6 in. in width and 9 to 11 ft. long, are carefully put together as shown in the drawing. This construction is as strong as the steel caisson, and is more durable. The wood is painted, and then given a coating of tar before it is put in place. The engraving, Fig. 1, shows the first section of the caisson being put in place. It is weighted by means of pig iron, the weight resting on the roof, and as the coffer dam sinks it is necessary to keep adding weight until as much as 50 tons may be required. As the caisson descends the air lock is removed and sections are added to the air shaft, keeping the air lock above ground at all times. The wood construction for the caissons in place of the steel usually employed makes it possible to tell with certainty about how long it will take to make the foundations. Where steel is used the contractor may be delayed for months, before he can have his order filled at the rolling mills. The cost also of the wooden caisson is somewhat less, but the great importance lies in the saving of time.

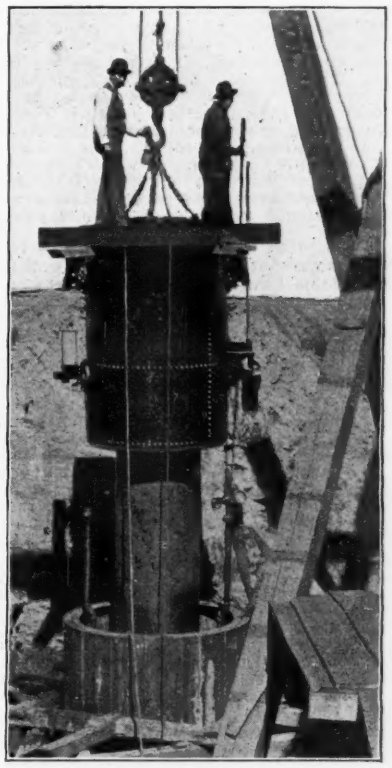


Fig 1.—O'Rourke's Air Lock and Caisson in Position.

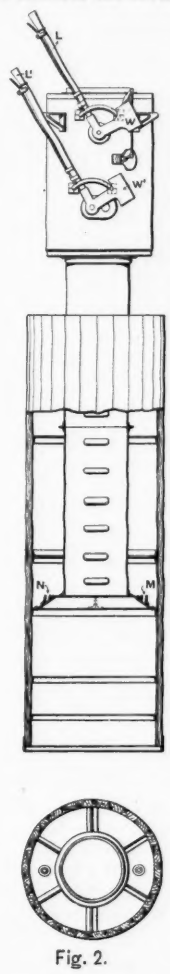


Fig. 2.

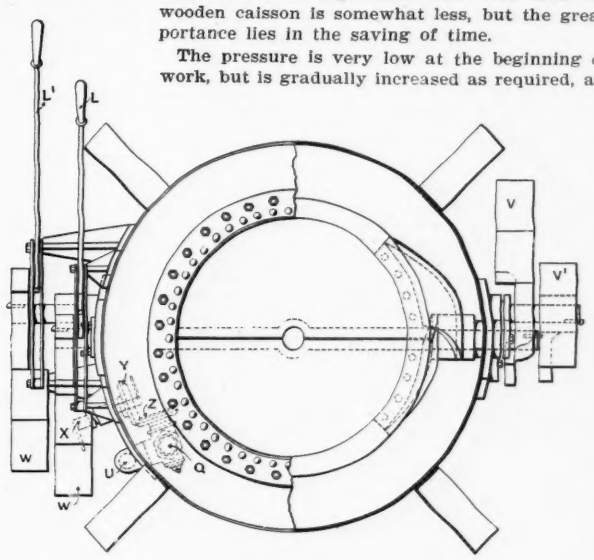


Fig. 5.—Top View and Section.

The pressure is very low at the beginning of the work, but is gradually increased as required, a sufficient amount being kept in the lower chamber to keep out the water.

These caissons, as improved, have recently been successfully used in making the foundations which have just been completed at 11 East Sixty-second street, New York City, and the engraving, Fig. 1, gives a general idea of the method of working at that place. the foundations referred to have been made for the dwelling of Mrs. Elliot F. Shepard, and this is the only private house for which pneumatic caissons have been used. Before the solid rock was reached

the caissons were forced through rock fill, then mud and clay, and finally through hard pan and boulders.

The architects of this building are Messrs. Haydel & Shepard, of New York. The Consulting Engineer is Mr. George Hill, M. Am. Soc. C. E., and the Engineer and Contractor is Mr. John F. O'Rourke.

The Scope and Effect of the Anti-Trust Act.*

In 1799 and 1800 the English Parliament passed the notorious "Combination Acts." By these laws, all combinations of laborers for the purpose of bettering their condition were declared illegal, and stringent penalties were provided for any violation of this principle. The mere act of a few independent workmen in agreeing with one another that they would not accept less than a certain rate of wages was judicially treated as a "conspiracy against the whole world" and punished accordingly. As late as 1834, some Dorsetshire laborers were transported to Botany Bay for the mere act of forming a labor union, which had committed no act whatsoever that could be construed as prejudicial to the public interest.

An act passed by Congress as recently as 1890 applies, in a somewhat different field, the principle of the Combination Laws of George the Third; and the consequences of this act, as set forth in recent decisions of the United States Supreme Court, are, if possible, yet more irrational than those of its English prototype.

To understand the case properly it is necessary to go back a little into past railroad history.

Prior to 1870, railroad freight charges in this country were in a parlous state. Our roads nominally had a freight tariff; but they used it so rarely that the charge made for their services was in practically all cases a matter of special bargain. In the investigation made by the Hepburn Committee a few years later, the General Freight Agent of the New York Central Railroad found it hard to name a single shipper who paid tariff rates for his goods. All this uncertainty was due to the irregular action of competition. . . . It was in the power of the worst managed and most short-sighted road to dictate the policy of all its competitors.

To meet these evils the system of pooling was adopted. A pool really involved two distinct parts; the formation of a joint schedule of rates at competitive points; and a division of traffic in order to remove the temptation to violate the rate agreement. The latter may seem to have been an unnecessary provision, but at the time when it was first put into use it was quite indispensable. For no rate agreement at competitive points is ever kept with absolute strictness. Even if the principals intend to live up to it, their agents have a thousand different ways of attracting traffic by special concessions, and violating the spirit if not the letter of the agreement. Now if each road gets the benefit of the irregularities of its own agents the officers of the other roads will suspect it of bad faith; but if each road is awarded a percentage of traffic, based either on its facilities for handling such traffic, or on the amount of such traffic which it has handled in the months immediately preceding, the ground for such suspicion is removed.

It was for this purpose that division of traffic was arranged, and it was fairly successful in accomplishing its object. The Chicago-Omaha pool was established in 1870; the Southern pool in the years 1872-1874; the Trunk Line pool in 1877-1879. In spite of occasional failures, the period of operation of these pools was one of great progress in systematizing railroad freight charges. The irregularities and special bargains in 1886 were far less than in 1869; and the legal authorities, judging pools by their effects on traffic management, began to regard them with increased favor. One has only to look back in a pamphlet like Judge Cooley's "Popular and Legal Views of Traffic Pooling," published in 1884, to witness the growth of this sentiment. But in 1887 the Interstate Commerce Act made all divisions of traffic misdemeanors, and deprived the railroad managers of this means of buttressing their agreements. A period of great demoralization in rates ensued. Hardly was this over when the anti-trust act of 1890 was passed, which went a step farther back and prohibited the rate agreements themselves. It is this act on which the recent decisions against the Trans-Missouri Association and the Joint Traffic Association are directly based.

What had these associations done? Had they formed a pool or division of traffic in violation of the Interstate Commerce Act? None whatever. Had they made an agreement to raise rates to an unreasonable figure? Far from it. In fact the Supreme Court, in pronouncing its verdict against the Joint Traffic Association for violation of the act of 1890, says that we may trust to the good sense of the managers to do, without an agreement, the things which the agreement itself is intended to promote.

But surely, the reader will say, if the law prohibited an agreement for a useful end, this agreement must have contained some clauses and some penalties whose enforcement was against public policy. Not at all. The Trans-Missouri agreement simply provided that any road which abandoned the contract should not remain a member of the Association. The trunk-line agreement did not even go as far as this; it simply provided that a schedule of rates jointly adopted as reasonable by a number of competing lines, should not be abandoned by the agents of one line without a resolution of the managers or directors of the road in question. It left each company absolutely free to do as it pleased, simply providing that a departure from the scheme of joint action should be signalized in a public and formal manner. It is this requirement of publicity and responsibility which is now declared illegal. It is a misdemeanor for the different roads to agree to do jointly a thing which it is not only proper, but salutary for them all to do without such joint action. Matters have come to the pass which they reached in the case of the English laborers alluded to at the beginning of the article—when the joint action is in itself an offence against the law, no matter how innocent its means or how salutary its objects.

It should be said in all fairness that the Supreme Court is not to blame for this conclusion. It is easy to read between the lines that they do not particularly approve of the consequences of their decision, but are forced by the language of the statute to make it what it is. . . .

The trend of these laws and decisions is all the more remarkable when we consider the opposite character of the legal development of England during the same period. While we have been moving in a direction adverse to trade combinations, English law and English practice has come more and more to favor them. While our courts hold that the mere agreement to make reasonable rates is under existing statutes a misdemeanor, the English courts, as in the celebrated "Mogul Steamship Case," will allow the enforcement of such agreements by methods little short of conspiracy. In the case alluded to, several lines attempted to destroy the business of a company which insisted on keeping outside of the combination which the others had formed; and the English courts, recognizing such combination as legitimate and inevitable, were disposed to allow the members of the combination great freedom in making it uncomfortable for outsiders. The same difference between England and the United States is seen in the attitude of the courts toward combinations of laborers. In England they are treated as prima facie legitimate; in America, they are treated as violations of the anti-trust act. In the former country every facility is offered for their development; in the latter every obstacle is placed in its way. In fact, as has been already pointed out in these columns, this whole body of anti-trust legislation, which was intended to attack capitalists, has proved even more severely burdensome to such of the laborers as came in contact with it.

*Yale Review, Nov., 1898.

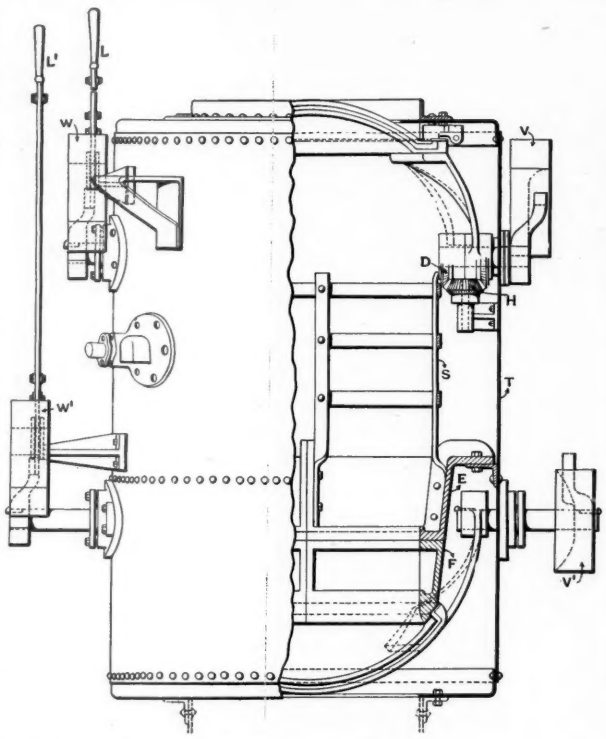


Fig. 4.—Air Lock—View at Right Angles to Fig. 3.

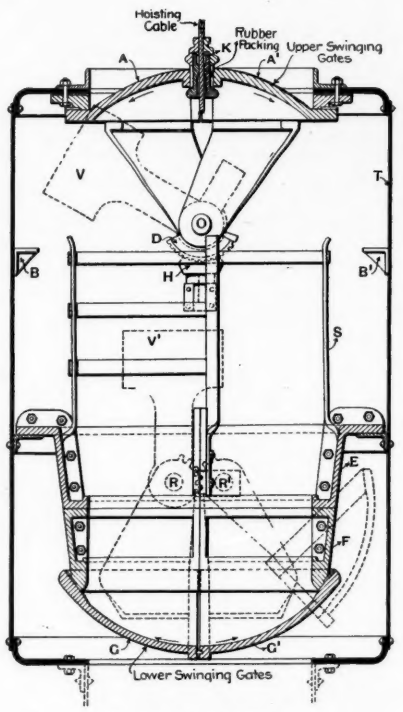


Fig. 3.—Section of Air Lock.

Abd El Kerim on the Ton-Mile.

It passeth all understanding that I, a true follower of the Prophet, who followeth in the footsteps of his forefathers, that I am bowed down with misfortune, clothed with the sackcloth and ashes of failure, while that heathen, who followeth not in the ways of the prophets, but presumeth to go by untried paths, waxeth fat in body and this world's goods.

Perchance it is my lot to carry for hire the fruit of the field or the rock from the quarry from Here to There. Each of the beasts of my caravan is laded with so many sheafs of corn or so many stones; each of the camels so many, and each of the asses so many; one sheaf of corn or one piece of stone, for a sheaf is a sheaf and a piece is a piece, whether great or small; but the burden of one camel is the burden of two asses, for I am a just man, as were my fathers before me. Yet the Evil One tormenteth me and the Gins delight to do me harm, for how otherwise cometh it to pass that the choice of my caravan become halt, the pride of my herd fall by the wayside, the swift lag behind and the tardy are first at the goal. Verily mine enemy worketh me harm with sorcery and witchcraft, for with these eyes have I beheld him use the balance and weights. He claimeth to use them to portion the goods, such a weight to each beast, according to his kind. But these are the tools of the Evil One, and Beelzebub helpeth his own.

Mine adversary doeth other strange matters, the meaning of which I cannot fathom, which therefore must be by the power of the Prince of Darkness. As my fathers before me, so know not I how to read or use the stylus in writing, for we are not priests or slaves, but free men and men of arms; neither know I the use of numbers or the keeping of accounts, as astrologers and magicians do; but that man doth, neither is he ashamed, but boasteth. That I might learn his secret charms and figures I did bribe his hired scribe to give me knowledge thereof, but by the beard of the Prophet, blessed be his name, though I saw the parchments and the marks thereon, they were worse than riddles to me, for there is an answer to the riddle within my comprehension, but the meaning of the parchments and the markings thereon pass my understanding, and I will none of them, for they are magic. The scribe prated of his accounts, whereby the cost of carrying was known as is the rising and setting of the sun, by which his master, may his soul rest in Sheol, was able to fix his charges and know the sum of his costs and profits, and, if need be, was enabled thereby to outstrip his opponents by this certainty of knowledge. He discoursed of talents and furlongs and talent-furlongs, and called them the measure of work and of cost and of profits. His words I heard and knew, but the meaning thereof was like the sun hid by clouds. A talent is money and a measure of weight; a furlong tells distance as doth a day's journey; but the sense of a talent-furlong passeth my knowledge.

Yet, though the scribe accepted my bribe, I am almost persuaded he is an honest man, and he did assure me that nothing of magic was in the parchments and signs thereon; that his master is a man not only with knowledge, but wisdom, and useth the accounts to prosper his business by knowing the costs, hence the profits; to compare the worth of this servant with that, to reward the faithful and upright, and to punish the careless and slothful; that he might thereby purchase that breed of camels and asses which carry the heaviest burdens, that stray not nor stumble, and eateth the least at the crib; that the accounts of themselves are as nothing save that the measure of work and of charges, of costs and accounts is the same, and the measure he named the talent-furlong. My soul is sorely vexed by these matters, and my mind like a weather cock, now this way, now that. Would that he had never been born, then would my business prosper and my herds increase.

Though this scribe may have mastered the arts of magic, yet he denieth it. Forsooth he saith this, that I should not learn its secrets also. If he be not a magician, then is he made mad by the talent-furlong, for of nothing else can he prate. He compareth it to the two arms of a warrior, the right and the left. With one a man may live as a fakir, by chance and by begging, but warrior he cannot be, and live, without both, for there needs must be both, for the bow and the sword and shield require both. This talk of the warrior is true, for that I and my forefathers have been, but this jumble of talents and furlongs, and what these advantage the warrior, I cannot fathom. Wherefore it is of little worth. I have said it.

The Coughlin Swing-Rail Frog.

Many inventors have tried to make a switch and frog which shall preserve the continuity of the main-line rail, but none of the older devices have long survived the severe tests of actual service except the Wharton switch, which keeps an unbroken rail at the switch point, but still leaves the break at the frog. The cost, the complexity, the difficulty of keeping the parts in adjustment have heretofore defeated all such efforts, so far as the frog is concerned. Obviously, the very desirable result of an unbroken main-line rail can only be secured by the use of a movable frog. For several years a movable frog, known as the Coughlin swing-rail frog, has been in some use, and has attracted considerable attention, and, now that experience with it in the track has demonstrated its

several good features, we feel justified in presenting it to the favorable consideration of our readers.

This frog embodies features that make the movable frog practicable. It consists of only two principal parts, the base, or fixed section, and the movable, or swing section. The base section, having a heavy base plate counter sunk into the ties and extending beneath the main rail, is securely connected to the ends of the fixed lead rails, and serves to hold these parts rigidly in position. It also forms a suitable support or foundation for the swing section, which is pivoted to it by means of a substantial hinge. The swing section is also locked from vertical motion, being held down to the base plate by a heavy clamp attached about midway. The swing section is

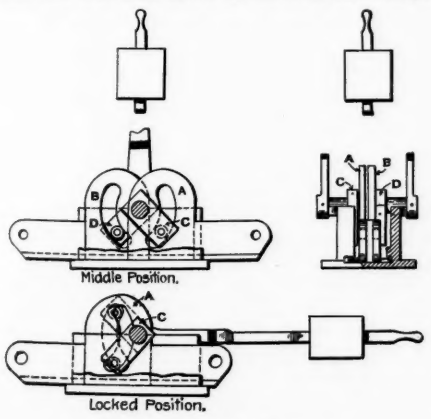
Frog Set for Main Line
(Lehigh Valley Railroad.)

made of 100-lb. rail, and carries the wheels 1¾" above the main rail, allowing ample flange way. The lead rails of the turnout which connect to the frog are brought up to the desired elevation by graduated elevating blocks. It will also be noticed that this elevation is on the outside rail of turnout curves.

The design is simple and substantial, and, from all information received, is reliable, safe and economical. It requires no guard rail on the main line, and thus eliminates an objectionable feature.

If misplaced, a main line train, trailing, will automatically operate the switch. We are informed that this feature has been thoroughly tested, also that under the conditions of snow and ice it requires less attention than the ordinary frog, and in general those who have used are satisfied that it saves cost in maintenance of way and maintenance of equipment.

A switch stand, specially adapted for operating this frog in conjunction with the switch, has been designed by the company. The feature of this stand is that the first half throw of the lever sets the points



Coughlin Switch Movement.

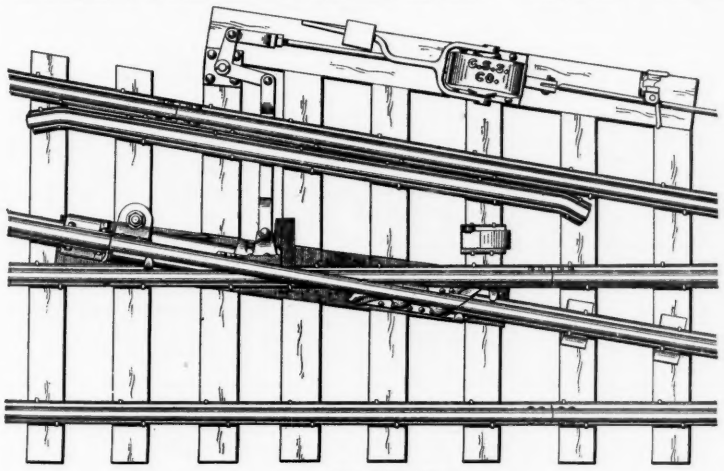
for the siding, and the second half or completion of throw operates the frog and locks the points. In resetting the switch for main line the frog is first thrown back and then the points. The pins working in the movable cams in the stand are fitted with steel rollers, which reduce friction, lessen the wear and facilitate the action. The parts are few and simple.

The Western Maryland Railroad put one of these frogs on trial nearly three years ago. That it gave entire satisfaction is evidenced by the fact that this company already has it in service at many points along its main line. The Principal Assistant Engineer also informs us that 14 miles of new road, which his company is now building, will be equipped exclusively with the Coughlin swing-rail frog and Wharton switches, giving unbroken track for the entire distance.

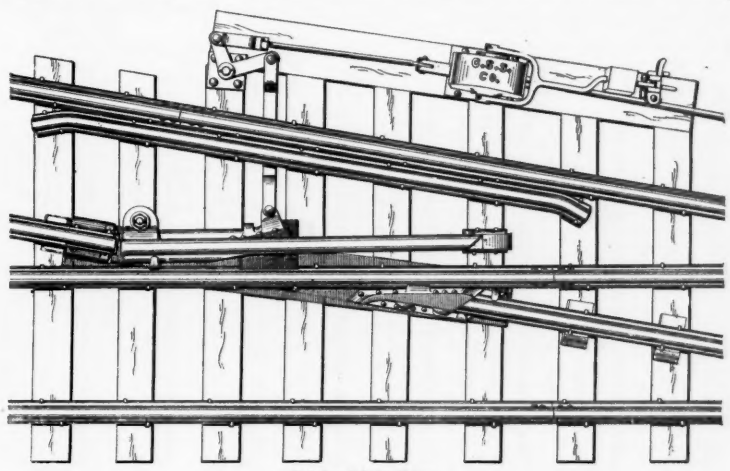
The Chief Engineer of the Chicago & Eastern Illinois says: "We had a little trouble with the swing-rail breaking when first installed, but have no complaints for fully a year past."

The photograph herewith gives a view of this frog on the Lehigh Valley tracks at East Penn Junction, Pa. Their Engineer of Maintenance of Way writes: "It has been in use for a year and a half, and there are probably forty or fifty movements a day on it, and it has never failed or given any trouble whatever." This road is using the frog at other points on its main line.

It has been put in recently on several other roads, and is giving the same satisfactory service. The company has established works at Carlisle, Pa., and has its general offices at 220 Broadway, New York City.



Set for Side Track.



Set for Main Line.

The Coughlin Swing Rail Frog.

Tests of English Express Locomotives.

Mr. Walter M. Smith, in a recent paper before the Institution of Mechanical Engineers, London, gave the results of tests made in 1896 on the North Eastern Railway to determine the fitness of five different classes of single expansion express passenger locomotives to perform a given duty. A dynamometer was used to measure the pull at the drawbar, indicator diagrams were taken at regular intervals, and it would seem that all the usual precautions were taken to secure accuracy in the measurement of the coal and water. The coal used was found to be very similar in quality, the calorific value varying from 14.85 lbs. to 15.32 lbs. of water evaporated per pound of coal from and at 212° Fahr.

The train was the same throughout the tests, and numbered 15 six-wheeled cars, the light weight of which was as follows:

	Long Tons.
4 Vans	45.8
6 Thirds	76.1
2 Composites	26.2
2 "	27.0
1 Dynamometer	10.8
Total	185.9

When equipped ready for the test the total weight of these cars was 186.5 tons.

Each engine made the double trip between Newcastle and Tweedmouth, a distance of 131 miles, and the train on each occasion was run as a special, its schedule time, 1¼ hours for each single trip, equaling that of the fastest and heaviest trains in regular service. During the test with engine B a severe rain and wind storm prevailed, but the weather was fair during the trials of the other engines.

Engines A and E were of the same type, each having four coupled driving wheels and a pair of leading truck wheels; engine B had a single pair of driving wheels, a four-wheel leading truck and a pair of trailing wheels; engines C and D resembled our eight-wheel engines in the arrangement of the wheels. All of these engines had inside cylinders and the dimensions, together with the principal results of the tests, are given in the table.

Dimensions and Performances of Five English Express Locomotives.

Letter of engine	A	B	C	D	E
Date of trial, 1896	Oct. 25	Nov. 8	Nov. 15	Nov. 15	Nov. 22
Weight of engine, tons*	39.500	46.950	50.800	50.700	42.100
" " fender, mean tons	25.345	32.478	33.394	34.810	26.309
Weight of train, tons	186.5	186.5	186.5	186.5	186.5
Weight of locomotive and train, tons	251.345	265.928	270.694	272.010	254.909
Cylinders, diameter and length of stroke, in. x in.	18¼x24	19x24	20x26	19x26	18x24
Driving wheels, diameter, in.	83⅛	91⅛	91⅜	84.⅝	83
Boiler pressure, lbs., per sq. in.	140	175	175	175	160
Length of boiler, ft., in	10—3	10—7	11—6	11—6	10—7
Diameter of boiler, in.	51	51	52	52	51
Letter of engine	A	B	C	D	E
Date of trial, 1896	Oct. 25	Nov. 8	Nov. 15	Nov. 15	Nov. 22
Length of firebox, ft., in.	5—6	7—0	7—0	6—9	5—10
Number of tubes	206	203	201	225	205
Diameter of tubes, in.	1¾	1¾	1¾	1¾	1¾
Heating surface, tubes, sq. ft.	999.7	1016.0	1089.0	1220.0	1026.2
Heating surface, firebox, sq. ft.	104.0	123.0	127.0	121.0	110.0
Heating surface, total, sq. ft.	1103.7	1139.0	1216.0	1341.0	1136.2
Area of grate, sq ft.	15.0	20.7	20.7	19.6	17.0
Pounds of coal burned per sq. ft. of grate per hour	136.400	109.646	90.790	99.965	110.958
Pounds of water used per sq. ft. of grate per hour.	893.190	873.910	767.900	770.260	887.720
Pounds of water used per hour	13,398	18,090	15,895	15,097	15,091
Pounds of coal burned per hour	2,046	2,270	1,879	1,959	1,886
Pounds of coal burned per hour per i.h.p.	3.65	3.11	2.92	3.03	3.11
Mean temperature of feed water, deg., Fh.	51.8	48.3	51.2	46.2	51.2
Pounds of water used per pound of coal double trip	6.54	7.97	8.45	7.70	7.99
Pounds of water used per pound of coal from water 212 deg. Fh. to steam 212 deg. Fh.	7.91	9.73	10.28	9.42	9.71
Pounds of steam per i.h.p. per hour from water 212 deg. Fh. to steam 212 deg. Fh.	28.87	30.26	30.01	28.54	30.19
Pounds of water used per i.h.p. per hour	23.87	24.78	24.67	23.33	24.84
Average i.h.p. for double trip	560	729	643	646	607
Calorific value of coal; water evaporated per pound from and at 212 deg. Fh.	15.32	15.02	14.85	15.04	15.11

*The ton used equals 2,240 lbs.

So far as known the greatest mean indicated h. p. was 753, which was exerted by engine B over a distance of 65½ miles. It was also shown that the h. p. was subject to comparatively gradual alterations only. The ratio between the indicated h. p. and that obtained from the dynamometer was not always the same, as was to have been expected. On an average the dynamometer h. p. was equal to approximately 64 per cent. of the indicated h. p.; thus 36 per cent. of the driving power was used to overcome the resistance of the engine and tender.

Mr. Smith discusses at some length the effect of stopping trains, and says: "On one occasion, a train weighing 266 tons and traveling at a speed of 37.5 miles per hour, was compelled to stop, owing to signal. The work stored up in this train before the signal was about 12,572 foot-tons, which would be sufficient to lift a locomotive and tender weighing 80 tons to a height of 157 ft. The work stored up in the train itself, exclusive of engine and tender, was about 8,815 foot-tons. To compare this with the power exerted in drawing the train, an instance may be taken in which the mean pull on the train for a complete journey was 1.354 tons. Here the above amount of work, 8,816 foot-tons, would have sufficed to maintain this train at a speed of 37.5 miles per hour for a distance of 8,816÷1.354=6,512 ft., or about 1.2 miles. In other words, the power spent by an engine in hauling the train for a distance of 60 miles is only about 50 times the amount of work disappearing when from any cause the train is brought to rest. Again, if an engine and train, weighing 266 tons and traveling at the rate of 50 miles per hour, are stopped by signal, the work stored up in them before the stopage would be about one-twentieth of the power required to haul the train a distance of 60 miles, or sufficient to haul the train a distance of three miles at an express speed of 50 miles per hour. It is not possible to determine completely the effect of a stoppage without recourse to experiment."

Foreign Railroad Notes.

A machine shop in Athens has contracted to build a locomotive for a Greek railroad company, which will be the first locomotive built in Greece.

The new embryo nation, Bulgaria, has a little state railroad system of 418 miles, representing a capital of about $22,650,000. The net earnings of this system in 1897 were $107,070, or less than ½ per cent. The gross earnings were $2,118 per mile; the net $256.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The interlocking switch and signal machine at Greensburg, Ind., which is described on another page of this issue, affords an example of the value of the simple expedient, introduced by the National Company a few years ago, of assembling the levers in the machine with a view to saving steps for the signalman. The Greensburg plant is of particular interest by reason of the tower, the iron signal posts, the foundations and other details, but the arrangement of the levers probably is a feature which is more immediately profitable than all the others. It was in the complicated signalling for the Metropolitan Elevated road of Chicago that the company first broke away from the time-honored rule of always putting all the switch and lock levers in the middle of the machine, and all those for distant signals at the extreme ends; and the increased facility was at once so apparent that the same innovation was repeated in the 224-lever machine at Hammond, Ill. (State Line), described in the Railroad Gazette of Dec. 17, 1897. In a large interlocking machine, with the ordinary arrangement, the signalman has to take many scores of steps (which means time lost, as well as unnecessary physical exertion in the busiest hours), which might just as well be avoided. In the new arrangement it is also possible, Mr. Hansel says, to reduce the number of lever movements necessary, and thus save wear of the machine. At Hammond there are now 155 active levers, attended by two men, who also handle all the telegraphic train orders and all other telegrams. At Greensburg the machine is practically divided into two distinct parts; the average number of movements each 24 hours is 2,451, and it is estimated that but for the grouping together in one part of the machine of those switch levers and signal levers that are most closely related to one another an additional attendant would have been required. The arrangement of the levers to save steps means, generally speaking, their arrangement roughly according to the location of the switches or signals to be worked. Thus, at Greensburg, all those levers controlling the tracks east of the coal chute (see diagram) and on the Y which are most frequently used, are at the right hand end of the machine, and, beginning with No. 38, they are grouped as follows: Two signals, one blank, one lock, two switches, one lock, one switch, one lock, two switches, one lock, four signals, one blank, one switch, one lock, one switch, one lock, two signals. See also article on page 873.

According to the daily newspapers, officers of the railroads carrying freight east from Chicago met in that city on Dec. 1 and formed a "gentleman's agreement" to restore rates on Dec. 12, to the basis of the normal tariff. (It has since been reported that there will be no advance before Jan. 1, several roads admitting that they had contracts to carry grain at low rates until that date.) The report continues:

"The meeting was the culmination of the demoralization in eastbound freight rates, which are in the worst condition in years. Since the Supreme Court gave its decision in the Joint-Traffic Association case rates have been going from bad to worse. Now that navigation practically has closed and all business has to go by rail, the railroads want higher rates. As the law prohibits the making or agreements for the maintenance of rates, the managers had no other way to accomplish the desired end than to agree on their word to maintain tariff rates. The session was stormy, and it was found no easy task to overcome the objections of all the roads."

But, according to the Sherman law, it is just as bad to agree on your "word" as to agree on a piece of paper. An agreement among "gentlemen" is as wicked as an agreement among burglars. The reporter evidently thinks that the railroad officers are doing what they did in 1891—making a six-line agreement which they will keep, instead of a six-page agreement which they have found they cannot keep. But, as is intimated in the report quoted, insurmountable objections will now be encountered in the attempt to make any agreement, short or long, for not every railroad officer, even in Chicago, will blindly butt his head against the Supreme Court. Probably, in point of fact, the meeting made no agreement whatever. A report which seems more credible is that of a circular which has been issued by the Chairman of the Central Passenger Association. This circular says:

"The following companies (naming them) severally and in their individual behalfs request the undersigned to announce that they will institute and participate in a rate of one and one-third fare for the round trip for a certain meeting."

The habit of making agreements seems, however, to die hard, and if the reporters have got the right view of the facts which they are trying to report, railroad officers in a half dozen places have laid themselves open to the charge of violating the anti-trust law, and therefore liable to a fine or imprisonment. A St. Louis paper reports that the executive officers of the roads west of that city (and it names a score of these officers), have held a meeting in that city and have reaffirmed their agreement of the past year for the restriction of passes. As many of the passes to which this agreement refers are those which are given to influence, directly or indirectly, the shipment of goods over the railroads interested, it is hard to see why each pass is not substantially the same as a rebate. If this is so, the giving of the pass is a violation of the Interstate Commerce law, if it affects interstate business—unless, indeed, the terms on which it is given are published in the freight tariff; and the agreement among the roads to thus modify or regulate competition is a "combination" repugnant to the anti-trust law. All the daily papers reported last week that the leading roads carrying soft coal east of the Allegheny Mountains, had agreed to make an advance of 10 cents a ton in rates. From Wilmington, Del., it is reported that the Pennsylvania and the Baltimore & Ohio have both at the same hour withdrawn reduced rate tickets which they have been selling from that city to Philadelphia. Nothing is said about an agreement, but the withdrawal of these tickets raises the fares, and how does it happen that both roads made the advance at the same moment? From St. Paul it is reported that the local passenger agents have agreed to restrict the sale of party-rate tickets to companies of 20 or more persons, who must be bona fide parties, not miscellaneous companies got together by the scalpers. It goes without saying, however, that, according to the principle of the Sherman law, the scalpers ought to have full liberty to use every trick they know of to keep competition active and to reduce fares to the lowest point possible. The railroads centering in Kansas City have agreed that hereafter they will not absorb switching charges on carloads of grain delivered to elevators in that city. This amounts virtually to an advance of from $2 to $5 a car, and most of the business is interstate. Why should not the United States District Attorney proceed at once against each road?

The Use of Track Tanks.

Not long ago the Maine Central Railroad discontinued the use of two track tanks which had been used by fast trains between Portland and Bar Harbor, and one of our contemporaries, commenting on this, said that opinion concerning the value of track tanks is rapidly changing, and that they do not pay under the general conditions in this country; that they are expensive to build and maintain, difficult to keep from freezing and to keep clean of cinders and dirt, and that the tender attachments are expensive. Probably it is a safe proposition that, except under certain somewhat limited special conditions, they do not pay, and we should question very much if they will ever be used except for fast passenger trains, running under competitive conditions, and, to a more limited extent, for a few freight trains; but that opinion as to their utility is changing or has changed we doubt.

The fact that the use of track tanks is still so limited after many years of experience with them is alone pretty good evidence that they do not pay, except for certain quite special cases. It is now about 38 years since the "Ramsbothom trough" was introduced on the London & North Western. It was then taken up on the Lancashire & Yorkshire, where it has long been used considerably to enable through freight trains to get over a line of intense traffic, by avoiding the delays of water stops. Later it was taken up on the Great Western and the North Eastern, both of England, to save the necessity for hauling tenders of great capacity on long distance express trains. In that country we have records of runs of 300 miles without stopping for water, and in America an occasional run even longer has been made.

In this country track tanks have long been used, and especially on Eastern railroads. Everyone who travels much is familiar with them. Probably the controlling consideration when they were first introduced here was the saving of time between competitive points; but as traffic has grown other considerations have entered. There are a few places in the country where the conditions of the Lancashire & Yorkshire are approximated, and where great care must be used to keep freight trains as well as passenger trains moving to get the volume of traffic over the road, as for instance the New York Division of the New York, New Haven & Hartford. Again, as the weight and speed of freight trains have grown it has seemed more important to avoid the cost of stops—not only the cost of the wasted energy, but the cost of accidents incurred in stopping and starting heavy trains. These considerations have come in where men have had to study the question of putting in track tanks.

The governing consideration in this matter has never been one of direct cost or direct economy, but has been and still is one of saving time. In competitive passenger business it may be advisable to spend considerable money to save a few minutes. For instance, on the Baltimore & Ohio run from Philadelphia to Washington, 136 miles, the express engines run through. They take water at two track tanks and at a standpipe in Baltimore while the trains are at the station. The total time saved on this run by the use of the two track tanks is estimated not to exceed, on an average, eight minutes, and indeed it is not necessary, with engine tanks holding 4,000 gallons, to take water more than twice on this run, although the present practice is to take water twice at tanks and once at the Baltimore station stop. In traffic of this nature every saving of four or five minutes is worth an appreciable amount, although it is an amount impossible to estimate with any accuracy. Of course, it is well known that the Pennsylvania uses track tanks on this same run (and elsewhere), but we have no estimate of their saving of time.

In the use of track tanks for freight trains the time element is perhaps less important than some of the others. The cost of stopping and starting, and the danger of breaking draft gear are there more important; but on a very crowded road the time saved is, too, worth considering. We have already mentioned the New York, New Haven & Hartford. There the General Superintendent of the Western District thinks that without doubt the greatest saving from the use of track tanks is in the freight traffic, and as a rule his freight engines are fitted with scoops. On the New York Central some freight engines are being so fitted, and it is now not uncommon on other roads to run fast merchandise trains with passenger engines, or with freight engines equipped with water scoops.

Apparently, however, there are operating facts which make such use of track tanks quite limited. Ordinarily, we should say that a freight train must stop so often for examination, or for interchange of cars, or for some other operating reasons, that it can take water at standpipes without extra stops, and, of course, the extra first cost of track tanks and tender scoops, and the cost of maintenance, will be avoided unless there are good reasons for incurring them. Obviously, if the passenger traffic conditions justify or almost justify, track tanks, the freight traffic might as well share in their use.

In all of this we have not touched on the cost of train stops and the economy of avoiding them. This is an obscure and complicated question. Many of those who read the Railroad Gazette in 1883 will remember the famous discussion precipitated by

Professor Stillman Robinson. He found that the cost of a "know nothing" stop was from $1.28 to $1.70. One of his critics applied this to an actual case and discovered that the cost of the stops made on a certain railroad would be, at that rate, more than the entire operating expenses of that road. There seemed to be something wrong about the figures. One careful and studious general manager tells us that in his calculations he has always taken 18 cents as the cost of stopping, including not only fuel, but wear and tear on rolling stock and track. One railroad officer has given us as an estimate reached after study of the operation of a big system 48 cents for passenger trains and 70 to 80 cents for freight trains. On another page is a letter from the General Superintendent of the New York, Chicago & St. Louis, telling of some experimental runs made on that road. One set of trains made 12 crossing stops; other similar trains ran the stops. The distance was 123 miles, and the coal saving was 50 cents, or a little more, for the run.

This would indicate that our general manager's figure, 18 cents, including wear and tear, is nearer right than the higher figures.

The extra cost of a track tank over a penstock is somewhat a matter of local conditions, depending on the amount of work necessary to fit the track for it. One officer puts it at $7,000, another at $10,000, but another tells us that the tank alone and extra connections, leaving out track work, is about $1,600.

On the whole it seems obvious that on roads of comparatively thin traffic and those which have much single track, where frequent stops have to be made for other purposes than taking water, track tanks are not likely to be considered profitable, but, on the other hand, we should suppose that there are now in the United States a good many roads which are hardly likely to confine their improvements to increasing the flow from standpipes so that a tender can be filled in two minutes instead of four or six, but that they will put in more track tanks and take out the stop entirely.

A press dispatch from Montreal says that the telegraph operators employed by the Grand Trunk contemplate striking. A committee has been negotiating for some time with General Manager Hays. Chief Davis, of the Order of Railway Telegraphers, says:

"The committee have seemingly exhausted all honorable efforts, and Mr. Hays insists on raising technical points. He wishes to delay the committee as much as possible, and refuses to treat with them without their first securing written authority from the individuals in the telegraph department to represent them. This the committee absolutely refuses to do. It is not necessary, and it has never been the custom. The fact that 90 per cent. of the telegraphers on the Grand Trunk belong to the O. R. T. is prima-facie evidence of our right to represent the men."

But why object to giving conclusive evidence? A prima-facie case does not amount to much before a court or a jury. We know nothing about the strength of the ties by which the 90 per cent. of operators are joined to their brotherhood; but if the fidelity of these members is as feeble as that of other brotherhoods has proved to be in many similar negotiations in past years, Mr. Hays has good ground for believing that somewhere from 25 to 75 per cent. of the operators would be found to be practically independent, and perhaps on the side of the company, when it came to a test. Brotherhood committees are so often self-appointed or lack binding authority that railroad managers are excusable for treating their claims with suspicion. On the other hand, if nine-tenths of the operators on the road are really united in a given policy, and have authorized a committee to execute that policy, why should they hesitate to avow their responsibility for it?

In another column we have made note of some of the "combinations" by which the railroads are trying to maintain reasonable rates, and thereby are tempting Government attorneys to test the efficacy of the anti-trust law. In this connection we note that the Commission which is investigating the conduct of the war has brought out a bit of testimony bearing on rate agreements. At a hearing held last Friday, Col. Charles Bird, of the Quartermaster's Department of the War Department, testified that he had found it impossible to get the railroads to compete with one another in making bids for the transportation of soldiers. This has to do, presumably, with transactions which took place several months ago, but it can hardly be true, and the Colonel's statement must be subject to important exceptions. Perhaps he is not correctly reported. We recall numerous cases during the war in which troops were carried by the railroads at such extremely low prices that it was plain there could have been no agreement between competing lines. As far as present practice is concerned, the Government certainly can find no fault. The Quartermaster at San Francisco has received a bid to carry a volunteer regiment thence to New York (as reported in our Traffic Column) at a price which would be about fair for cattle by the carload.

Press dispatches during the past week indicate that eastbound rates on grain have reached a depth never before equaled. We cannot say that these rates have gone to the bottom, as there is still enough income from the business to pay for the coal used in hauling the train, and perhaps something for the wages of the trainmen. From Duluth it is reported that, the vessels having stopped accepting grain to go by water, the railroads are actively bidding for it, and wheat has been contracted to New York at 10 cents per 100 lbs., equal to about 1.4 mills per ton per mile. At the same time, it is reported from Chicago that one road is taking grain to New York at eight cents per 100 lbs. From this rate three cents is supposed to be deducted for lighterage, leaving five cents for the railroad, which, calculating on the average distance, would be equal to 1.06 mills per ton per mile.

TECHNICAL.

Manufacturing and Business.

A permit has been issued in Pittsburgh to the Pennsylvania Car Wheel Co. for building a one-story foundry, to cost $2,900; and for a one-story storage and boiler house, to cost $2,400.

The American Steel Casting Co. has declared a dividend of 3½ per cent. on its preferred stock, payable Dec. 20.

The General Electric Co. has declared a dividend of $17.50 per share on its preferred stock, payable Dec. 22.

The Wm. Cramp & Sons Ship & Engine Building Co. has declared a dividend of 1¼ per cent., payable Dec. 15.

Consul Jackson writes from La Rochelle, France, under date of Nov. 9, that there is an opening in his Consular District for several steam engines and boilers of American make. The engines must be 35 h. p. and the boilers capable of supplying these engines. Correspondence with specifications and prices should be addressed to Grenfel Stewart, 13 Rue du Palais, La Rochelle, France.

C. H. Boaz, Vice-President of the Sterlingworth Railway Supply Co., whose office was in the Home Life Building, New York City, which was partially destroyed by fire this week, has moved to 218 William street temporarily.

Articles of incorporation have been filed in New York state for the Elmira Mfg. Co. of Elmira. The capital stock is $300,000, all subscribed. The objects of the company are to make and sell hydraulic steam and other engines and machinery. The officers are: President, I. D. Booth; Vice-President, F. E. Doolittle; Secretary, S. C. Estey; Treasurer, S. J. Hall; General Manager, N. A. Johns; Attorney, Chas. M. Marvin. The Directors are the above named officers, together with Henry A. Moore, F. Bright, B. M. Masten, C. H. Firman, F. H. Rees, Wilbur Kenzie and J. N. Ward.

The Stilwell-Bierce & Smith-Vaile Co. has declared a dividend of 2 per cent. on its preferred stock, payable Dec. 1.

The sixth annual report of the Michigan-Peninsular Car Co. for the year ending Aug. 31, 1898, shows the net earnings to be $670,877. Deducting from this the interest on $2,000,000 of the 5 p. c. bonds, amounting to $100,000, and 6 p. c. on the preferred stock, amounting to $300,000, a surplus of $270,877 is left.

John Henry Hall has been appointed Receiver for the Consolidated Pneumatic Tool Co. of New York and Philadelphia.

Bids were opened Nov. 30 by Commodore Endicott, Chief of the Bureau of Yards and Docks, for the building of a combined floating and graving steel dock at Algiers, La. The limit of cost is $850,000. Charles L. Bradbury, of New York, bid the exact limit, and the Maryland Steel Co. bid $810,000. The latter company also submitted an alternative proposition, which included additional equipment not provided for in the plans of the Bureau, at a cost of $837,000.

The Price Rail Joint Co. of Philadelphia has been incorporated in West Virginia to make and sell rail joints, metallic ties, etc. The authorized capital is $5,000,000; the subscribed capital, $1,000, of which $100 is paid in. The incorporators are: Frank E. Martin, W. C. Wolfersperger, Edwin G. Evans and David F. Lightfoot, Philadelphia.

The Babcock & Wilcox Co. reports sales of boilers aggregating 600 h. p. to the Northern Pacific for supplying steam for power, heating and electric lighting for the new shops at Brainard, Minn.; and of 500 h. p. to the Boston & Maine, to be used in the electric power plant of the Portsmouth & Dover Electric RR. Co.

The London office of the Westinghouse Electric & Mfg. Co. has recently secured a number of important contracts for electric railroad apparatus from some of the larger cities in England, among which are the following: For the Hull Tramway Corporation, 92 motors to equip 45 cars and one track sweeper; for the Halifax Tramway Corporation, 12 motors to equip six cars; for the Bradford Tramway Co., 48 motors to equip 24 cars; for the City of Norwich, 80 motors to equip 40 cars, and four generators to be installed in the power house of the Norwich Tramway Corporation; for the city of Coventry, 20 motors to equip 10 cars, and two power generators, and for the seaport city of Plymouth, 10 motors and two power generators. This makes a total of 262 electric motors and eight generators.

The Ramapo Wheel & Foundry Co. is offering its car wheel and foundry plant, located at Ramapo, N. Y., for lease, and the machinery, tools, fixtures and stock for sale.

The engine forgings and shafting for the torpedo boat destroyer "Farragut" were made by the Bethlehem Iron Co. This boat steamed over 30 knots on her official trial.

The Chicago Shipbuilding Co. last week received an order for two large steel freight boats, a steamer and tow barge, to be operated by the Minnesota Steamship Company. These vessels will be about 500 ft. long over all, and are the largest ever built at the South Chicago yards. It is said they will cost about $400,000.

Iron and Steel.

The negotiations by which the Cambria Iron Co. is leased to the Cambria Steel Co. have been completed.

On Nov. 30 the Birmingham Rolling Mill Co. made an assignment. Since then the bankruptcy proceedings have been suspended and John W. Barr and Thomas Ward, the assignees, have been appointed Receivers. The original capital of the company was $250,000, which has been gradually increased to $575,000. Bonds to the amount of $200,000 have been issued, but never sold, having been used as collateral in effecting loans.

New Stations and Shops.

Several weeks ago we stated that the shops of the Southern Pacific at Sacramento, which were partly destroyed by fire, would be rebuilt. The company is now putting up a two-story building, 71 x 186 ft., the lower story of which is to be used as a car machine shop, and the second story for plating and upholstering rooms; and a two-story building, 86 x 225 ft., the lower story of which will be used for a planing mill and wood-working shop and the second story as a cabinet and pattern shop. Both buildings will be of brick, with iron roof trusses and corrugated galvanized iron covering. They will be built on the foundations of the burned buildings, some of the walls that were not damaged being used.

It is stated that the Quebec, Montmorency & Charlevoix will build large car works at St. Sauveur, Quebec.

We are officially informed that the Illinois Central has let a contract for building a new passenger station at Champaign, Ill., to the George B. Swift Co., of Chicago. The building will be 40 ft. wide, 182 ft. long and one story high. It will be of pressed brick, with Bedford stone trimmings, and slate roof, and will be located on the west side of the tracks, directly opposite the old site. Work on the foundations has been commenced.

New Gun Works for Newport News.

Mr. C. P. Huntington has this week been quoted at length to the effect that Vickers, Sons & Maxim, the English shipbuilders, have been negotiating for an interest in the Newport News Shipbuilding & Drydock Co. If these negotiations are carried to a conclusion, a large plant for making guns will be established in connection with the shipyard. Mr. Crosley, Mr. Dunn and Mr. Loewe, of England, who are connected with Vickers, Sons & Maxim, recently visited the shipyard. Mr. Huntington says that a large interest will be retained by himself.

Electric Railroads in Shanghai.

Messrs. Blackall & Baldwin, 29 Cortland street, New York, will receive tenders for building 23 miles of electric street railroads in the streets of Shanghai, China, which Consul General Fowler, at Chee Foo, reports about to be built. Plans and specifications can be had on application to them. A certified check for $500 must be deposited to secure return of documents issued to bidders, and a certified check for $500, upon one of the State or National banks of New York, drawn to order of Blackall & Baldwin, must accompany each bid. Bids to be in by 12 m., March 15, 1899. Right is reserved to reject any or all bids. Mr. Chas. Mayne, Municipal Engineer, Shanghai, China.; J. O. P. Bland, Secretary, Council Room, Shanghai, China.

THE SCRAP HEAP.

Notes.

The Empire State Express is to have a twin sister, so to speak; though of course the Empire will not be deprived of the honor of being the elder of the twins. The New York Central announces that next summer a fast train will be run every week day between New York and Saratoga Springs, making the run in 3½ hours. This is about the speed of the Empire State Express over the Hudson Division, Saratoga being 38 miles north of Albany, on the Dela-

ware & Hudson road. The new train will leave Saratoga at seven o'clock in the morning and return from New York at four o'clock in the afternoon. New cars are being built for the train.

Isaac Schultes, station agent of the Grand Rapids & Indiana, at Martin, Mich., has a burglar alarm in his dwelling house, connected with the ticket office, and one night recently when three men got in and tried to open his safe Schultes and his assistant went out with rifles and opened fire on the robbers. They were not driven off without a considerable fight, and the assistant agent, Marshall Wickes, was wounded by one of the robbers' bullets. The robbers were afterwards captured.

At a union meeting of railroad brotherhoods, at Norfolk, Va., Nov. 29, Mr. Sargent, Chief of the Firemen, announced that his brotherhood intended to try to secure white supremacy in the railroad service in the Southern States. He said that firemen in some parts of the South receiving $30 a month asked for higher pay and were told that colored men could be hired to do their work for $25.

An ordinance providing for raising a loan of $2,000,000 for elevating the tracks of the Philadelphia & Reading, at Ninth street, Philadelphia, which has been before the Council of that city for several months, is again being talked of in the newspapers of the city, but it does not appear that anything is likely to be done at present. The fast trains of the New York Division of the road run over this portion of the line, and the tracks are in the middle of the street, on the surface, so that a change in grade or location is greatly needed; but the railway company seems to have no disposition to proceed in the matter, and opponents of the ordinance in the City Council say that the city is already saddled with as heavy a load of debt for railroad tracks as it can bear.

The suit brought by the Atchison, Topeka & Santa Fe against the Western Union Telegraph Company to compel the latter to accept, without revenue stamps, telegrams carried by the contract existing between the two companies, has been withdrawn, and it is understood the matter will be settled out of court.

Libel suits have been filed in St. Louis by two ticket brokers against John A. Lee, Secretary of the Interstate Merchants' Association of St. Louis; A. M. Compton of Chicago and Lafayette McWilliams of Chicago, because of the speeches made by these men at the anti-scalping meeting at St. Louis, Nov. 29.

Passenger train No. 74 of the Missouri Pacific was stopped by robbers near Sedalia, Mo., on the evening of Nov. 29, but the Superintendent had been warned of the proposed attack and he had armed men on the train, who captured one of the robbers. The captive proved to be an engineman, who had worked for the company several years. One of the Minnesota train robbers was convicted Dec. 2 and sentenced to 20 years' imprisonment.

A bill has been introduced in the Legislature of Georgia to prohibit the issue of passes or free privileges by railroads to any state officer or member of the Legislature.

Representative Moody, of Massachusetts, has introduced in Congress a bill to amend the war revenue act so that express companies doing less than $100,000 business yearly shall pay a tax of 1 per cent. of their earnings, in lieu of the stamp tax.

Mr. W. R. Corwine has recently traveled through the Western states in behalf or the Merchants' Association of New York City, to work up interest in the movement to compel express companies to pay the 1 per cent. tax on each bill of lading and the movement for reform in the consular service of the United States. He says that the mercantile community in the West are all up in arms against the position assumed by the express companies, and he received hearty promises of co-operation. It is proposed to ask State Legislatures and Congress to place express companies under the authority of the railroad commissions.

The United States District Court has dismissed the suit of the Atchison, Topeka & Santa Fe Railway Company to compel the Western Union Telegraph Company to affix and pay for the revenue stamps on the messages transmitted under its contract with the road. The contention of the Atchison was that the service which the telegraph company agreed to give was to be free of all charges. The telegraph company's answer was that it could have no responsibility for the taxes laid by the United States Government on telegraphic messages, and especially in view of the repeated rulings of the Commissioner of Internal Revenue that the law requires the "maker, signer, or issuer" of telegraphic messages to affix and pay for the stamps.

Motes, Beams and Hypocrites.

Mr. Daniels has not favored the public with a Scriptural exhortation for some time, but it must not be hastily assumed that he has discarded his Bible; on the contrary, he keeps it constantly at hand, and its precepts in his head, as will be seen from the following story published in the daily papers on last Lord's day:

Recently the "weak" trunk lines learned that the standard lines had put into effect lower rates from the Pacific Coast, practically killing the weak lines' differential. The steps were taken somewhat secretly, and the differential lines did not learn of the change until some time after the circulars had been sent out. A meeting was held in New York, and a telegram was sent to G. H. Daniels, of the New York Central, and the other G. P. A.'s, which was in part as follows:

"We learn with regret that at this most inopportune time, without conference or advice, you have arbitrarily reduced regularly established fares. We deprecate such arbitrary action as tending to demoralize and calculated to provoke retaliatory measures and unnecessarily reduce the revenues of all lines. We therefore request an immediate restoration of rates to those in effect Nov. 1, 1898."

One of the first replies received was from Mr. Daniels. It read as follows:

"I think it would be an opportune time for you to read the forty-first verse of the sixth chapter of the Gospel according to St. Luke."

This verse reads: "And why beholdest thou the mote that is in thy brother's eye, but perceivest not the beam that is in thine own eye?"

Mr. Martin, of the Baltimore & Ohio, the chairman, wired back:

"Your telegram received. We have been guided through life by the teachings of St. Luke, and fully concur that his sixth chapter is very appropriate to the case in point, and for your personal application would advise reading last half of verse immediately following." ["Thou hypocrite, cast out first the beam out of thine own eye, and then shalt thou see clearly to pull out the mote that is in thy brother's eye."]

Mr. Sinclair's Fire.

Mr. Angus Sinclair, President of the Angus Sinclair Company and editor-in-chief of Locomotive Engineering, informs us that his present address is 95 Liberty street, New York City. The office of his journal was destroyed in the recent fire in the Home Life Insurance Building in New York. Necessarily, a very important part of his library and records is destroyed; in fact, he was left with nothing in the office. Nobody but an editor and publisher can appreciate what a misfortune this is. We have no doubt, however, that Mr. Sinclair will be out with his January number in good shape and on time, and we extend to him our best wishes.

The Drainage Canal and Public Health.

Dr. A. R. Reynolds, Commissioner of Health, has sent a letter to the Trustees of the Sanitary District recommending an exhaustive series of chemical and bacteriological examinations of the waters between Lake Michigan at Chicago and the Mississippi River at St. Louis with the object of determining their condition and quality before the completion of the drainage canal, for comparison with their condition after the channel is opened. Dr. Reynolds' suggestion is based on the assumption that St. Louis and the lower Illinois Valley really believe that the drainage channel will be injurious to their health by affecting their water supply, and that the way to remove these fears is to ascertain and present the facts.

Shipping Locomotives in Chemnitz.

One of the largest manufacturing establishments in Europe, and one which sells locomotives right under our noses in Mexico, Venezuela, etc., to say nothing of competing with us in Java and other distant lands, is not even on a railroad track, and has no siding. Locomotives are hauled about half a mile through the streets of Chemnitz to the railroad on a float.

Chicago Notes.

The City Council has rejected the ordinance permitting the use of overhead trolley wires along Wabash avenue and State street north of Twenty-second street. Mayor Harrison has vetoed the ordinance providing for the use of natural cement instead of Portland as a foundation for street pavements.

On Nov. 30 the Board of Local Improvements passed an ordinance for paving six additional streets, four with brick and two with asphalt. Vitrified brick will be used on Halstead street between Van Buren street and the Chicago River.

Postmaster General's Report.

The Postmaster General has made his annual report, for the year ending June 30 last. The ordinary revenue for the year was $87,815,985; receipts from money order business, $1,196,633; total receipts, $89,012,618, and expenditures, $98,033,523. The increase of receipts over the preceding year is $6,347,155, or 7.6 per cent. Expenses increased 4.2 per cent. Since 1880 the postal business has multiplied nearly three-fold, though the population of the country has increased only about 50 per cent. The report says that but for the gross abuse of the privilege given by law to second class matter the deficit would long ago have disappeared. Among the recommendations made for legislation by Congress are the following: That a severer penalty be provided for employees of the service who may be found guilty of embezzling or destroying newspaper mail; that, in order to provide greater safety and security to letters sent in the registered mails, both foreign and domestic, a special stamped envelope of superior material, of the denomination of 10 cents, be adopted, and that all persons who desire to register letters be induced to purchase these envelopes at the face value of the stamp; that the use of postage stamps as currency be taken up and considered with the view of curtailing their use as money, and that an appropriation be made for purchasing a new outfit of telltale locks for use in mailing registered matter.

LOCOMOTIVE BUILDING.

The Erie is figuring on buying 50 locomotives.

It is reported that the Michigan Central will buy 10 10-wheel freight locomotives.

The Bangor & Aroostock is preparing specifications for four new engines.

It is reported that the Ogdensburgh & Lake Champlain has ordered two new engines.

The Arkansas Midland is having one locomotive built by the Baldwin Locomotive Works.

The Union Stock Yards Co. is having one locomotive built by the Baldwin Locomotive Works.

The Rogers Locomotive Works are building two locomotives for the Marianao & Havana of Cuba.

The Monterey & Mexican Gulf is having one locomotive built by the Baldwin Locomotive Works.

Pittsburgh papers state that the Pittsburgh & Lake Erie has prepared plans for five new engines.

The Baldwin Locomotive Works are building two locomotives for the Oahu Railway & Land Co. of Hawaii.

The New York Central & Hudson River has ordered 30 locomotives from the Schenectady Locomotive Works.

The Baldwin Locomotive Works are building one locomotive for the Baturite, one of the state railroads of Brazil.

The Lake Shore & Michigan Southern order for 45 locomotives has been placed with the Brooks Locomotive Works. Fifteen will be consolidated engines.

It is reported that within one year the Lake Shore & Michigan Southern will buy 200 engines, including the 45 just ordered from the Brooks Locomotive Works.

In our issue of Nov. 18 we stated that the Southern Pacific would buy a number of locomotives. The company has now ordered about 26 from the Cooke Locomotive & Machine Works, and about 20 from the Schenectady Locomotive Works.

The two 10-wheel freight engines which the Baldwin Locomotive Works are building for the Ann Arbor, as mentioned in our issue of Nov. 25, are for January delivery, and will weigh 97,000 lbs. on drivers, the total weight being 125,000 lbs.; cylinders will be 19x26, drivers 56 in. in diam.; boilers, wagon top; steam pressure, 180 lbs.; fireboxes, 107⅝ in. long and 33¼ in. wide; tank capacity, 3,600 gals. Westinghouse air brakes, hammered steel axles, Marden brake beams, Trojan couplers, Star headlights, Sellers' injectors, U. S. Metallic piston and valve rod packings, Leach sanding devices, Detroit lubricators and Crosby gages will be used.

Last week we noted that the Baltimore & Ohio had placed an order with the Pittsburgh Locomotive and Car Works for 50 consolidation locomotives. These engines will have 152,800 lbs. on the drivers, the total weight being 168,000 lbs. The cylinders will be 22 in. in diameter x 28 in. stroke; drivers, 54 in. in diameter; boilers, extended wagon top; working steam pressure, 180 lbs.; fireboxes, 118 in. long and 41 in. wide; tank capacity, for water 4,500 gals., for coal 8 tons. The engines will be equipped with Westinghouse air brakes, steel axles, National hollow brake beams, Buckeye couplers and U. S. metallic piston rod and valve packings, and will have steel wheel centers.

CAR BUILDING.

It is reported that the Cincinnati Northern is about to order 100 gravel cars.

The Illinois Central has ordered two dining cars from the Barney & Smith Car Co.

It is reported that the Ogdensburg & Lake Champlain has ordered three new passenger coaches.

It is stated that Murray, Dougal & Co. have received an order from the Pennsylvania for 43 tank cars.

The Boston & Albany ordered 300 cars from the Union Car Co., instead of the Laconia Car Co., as stated last week.

The Columbus, Sandusky & Hocking has asked bids on 200 coal and 100 box cars. Contracts will be let the coming week.

It is stated that the Michigan Peninsular Car Co. has received an order from the Erie for 2,000 box cars of 600,000 lbs.' capacity.

The Pennsylvania Company will shortly build 80 Class G k gondola cars at its Fort Wayne shops. They will be of 80,000 lbs. capacity.

The Cincinnati, New Orleans & Texas Pacific has asked bids for 100 flat, 300 coal and 100 furniture cars. Contracts will be let the coming week.

It is stated, but not confirmed, that the New York Central & Hudson River has placed an order with the Wagner Palace Car Co. for 25 passenger cars.

The Rio Grande Western has let a contract for 250 box cars to the Missouri Car & Foundry Co., and is asking bids on 100 additional box cars, 100 stock cars and 100 coal cars.

We are informed by the General Manager of the Iowa Central that the road does not contemplate buying any more equipment at the present time, as rumored last week.

It is reported that the Delaware, Susquehanna & Schuylkill has ordered eight caboose cars from the Jackson & Woodin Manufacturing Co. We have not been able to verify this.

It is reported that the Oregon Short Line will order 1,000 freight cars. The same report states that J. F. Dunn, the Superintendent of Motive Power, has been visiting car shops in the East arranging for bids.

The Chicago Great Western is preparing specifications for a number of freight cars, probably 700 or more, but we are officially informed that the company is not yet in the market, as reported by a contemporary last week.

The Buffalo, Rochester & Pittsburgh has ordered 150 hopper bottom coal cars of 40 tons' capacity and 50 coke cars of 40 tons' capacity from the Jackson & Woodin Mfg. Co., and 100 coal and 50 box cars from the Buffalo Car & Mfg. Co. They will have Butler drawbars and Trojan couplers.

Last week we stated that the Chicago, Burlington & Quincy had issued specifications for 600 stock and 600 box cars. The order for the stock cars has been given to the Illinois Car & Equipment Co. They will be 36 ft. long and of 50,000 lbs. capacity. The box cars, which will be 34 ft. long, with a capacity of 60,000 lbs., have been ordered from the Wells & French Co.

The 50 furniture cars ordered by the Wabash from the St. Charles Car Co., mentioned in our issue of Nov. 11, will weigh 39,000 lbs., will be 45 ft. long inside, 8 ft. 7 in. wide inside, and 8 ft. 8 in. high. The capacity will be 60,000 lbs. Simplex bolsters, Sterlingworth brake beams, Westinghouse air brakes, Gould Couplers, Lawler doors, Hutchins roofs and Scott springs will be used.

In our issue of Nov. 18 we stated that the St. Louis, Peoria & Northern was preparing specifications for 200 coal and 200 box cars. The company has now ordered the 200 coal cars from the St. Charles Car Co. and the 200 box cars from the Missouri Car & Foundry Co., and will soon begin ordering equipment for its extended line, including 2,500 freight

cars, for which specifications are now being prepared.

The 100 flat cars ordered by the Chicago & West Michigan from the Terre Haute Car & Mfg. Co., as noted in our issue of last week, are for January delivery and will be of 60,000 lbs. capacity and 37 ft. long. They will have iron axles, Fox truck bolsters, National hollow brake beams, Westinghouse air brakes, Gould couplers, Butler draft rigging, McCord journal boxes, Detroit springs, and Fulton Iron and Engine Works brasses.

The Chicago, Rock Island & Pacific is having 50 double deck stock cars built at its Horton shops. They will weigh 33,500 lbs., will have a capacity of 60,000 lbs., will be 36 ft. long, 9 ft. 4½ in. wide, 7 ft. high, and will be built of wood. They will be equipped with Bettendorf brake beams, Westinghouse air brakes, C. R. I. & P. brasses, Janney couplers, pocket draft rigging, McCord journal box lids, double board roofs, rigid trucks and cast iron wheels.

As stated last week, the Baltimore & Ohio has ordered 1,000 steel double-hopper cars from the Schoen Pressed Steel Co. These will be 30 ft. long inside, 8 ft. 8½ in. wide inside and 10 ft. 2½ in. high over body; will weigh 34,000 lbs. and will have a capacity of 90,000 lbs. The axles will be steel, with journals 5 in. x 9 in.; bolsters, steel, built in car frame. The cars will have National hollow brake beams, M. C. B. brake shoes, Westinghouse brakes, Buckeye couplers and pressed steel journal box lids. The wheels will be cast iron, 33 in. in diameter, weighing 650 lbs. each. The cars will be painted standard B. & O. brown.

The Wells & French Co. is reported to have an order for 30 tank cars for the Swift Refrigerator Line.

The Third Avenue Railroad Co. of New York City has asked several car builders to prepare specifications and bids for 100 or 125 new cars.

The Taunton Locomotive & Manufacturing Co. has an order from the Metropolitan Street Railroad Company of New York for 12 snowplows.

BRIDGE BUILDING.

BUTLER, PA.—Enos McDonald, County Surveyor, Cristy Robb and Henry Bright have been appointed viewers for the bridge over the Connoquenessing Creek, in Forward Township, Somerset Co.

CINCINNATI, O.—The King Bridge Co., Cleveland, O., has received the contract at $49,900 for building the superstructure of a bridge 465 ft. long over the Big Miami River near New Baltimore, Hamilton Co. A. J. Wellman has the contract for the substructure at $34,798. (Sept. 30, p. 712.)

CROOKSTON, MINN.—A bridge has been ordered built over Clearwater River in Wyandotte Township by the County Commissioners.

FOLSOM, CAL.—According to report, plans are being prepared for repairing three bridges on the county road near Folsom, Sacramento Co. With roadway and hillside work, the estimated cost is $3,000. J. C. Boyd, Engineer, Sacramento, Cal.

GRAND ISLAND, NEB.—A bridge is contemplated across the Platte River, south of Grand Island, to connect Hall and Hamilton counties. There will probably be four bridges, to be about 300, 400, 600 and 700 ft. long, respectively.

KANSAS CITY, MO.—(See Electric Railroad Construction column.)

MINNEAPOLIS, MINN.—Bids are asked until Dec. 9 for supplying the iron and steel work for widening the stone arch bridge over the east channel of the Mississippi River. Thirty thousand dollars has been appropriated for the work. F. W. Cappelen, City Engineer. (Aug. 26, p. 616.)

MOKELUMNE HILL, CAL.—The citizens of Calaveras County have asked the County Commissioners to build a bridge across O'Neill's Creek on the road from San Andreas to Sheep Ranch. H. B. Wiegand has the matter in hand.

NEVADA, O.—According to report, an iron bridge is to be built across the Rhine River by the County Commissioners to replace the present wooden bridge.

NEW YORK, N. Y.—The Board of Estimate and Apportionment has authorized Bridge Commissioner Shea to expend $100,000 in making surveys and soundings for the approaches to the two new bridges over the East River, which the Mayor has suggested. (Dec. 2, p. 865.) The East River Bridge Commissioners have asked for a bond issue of $1,500,000 to continue the work.

NEW WESTMINSTER, B. C.—The city intends to have a traffic bridge built across the Fraser River at that place, and a committee has been appointed with this object in view.

NORFOLK, VA.—Bids are asked until Dec. 28 for building the sub and superstructure for a steel highway and drawbridge over Smith's Creek. W. T. Brooke, City Engineer.

OMAHA, NEB.—Chief Engineer J. B. Berry of the Union Pacific has communicated with City Engineer Rosewater, stating that the Union Pacific and the Chicago, Burlington & Quincy will probably send revised plans and specifications to the city for the proposed new Sixteenth St. viaduct. (Sept. 23, p. 595.)

OWEGO, N. Y.—On Nov. 19 the Town Board voted in favor of building an iron bridge across the Owego Creek, to cost about $10,000. An engineer is to prepare the plans and ask for bids, and the contract will probably be let early in the spring.

TORONTO, ONT.—At a recent meeting of the York County Council it was decided to erect a steel bridge over the Rouge River, near the village of Markham. The Toronto Board of Works has deferred until next year the rebuilding of the Humber bridge, as recommended by the City Engineer. (Jan. 14, p. 31.)

An iron bridge over the Don at Queen St. is to be built, and the city is considering an issue of $62,500 bonds for the work.

VICTORIA, B. C.—An arched bridge has been recommended by City Engineer E. A. Wilmot built over the James Bay Flats.

WASHINGTON, D. C.—As to the proposed Massachusetts Ave. bridge and the Connecticut Ave. bridge across Rock Creek, the Engineer of the Bridge Committee has reported to the Board of Trustees that the appropriation of $50,000 made by Congress is for the preparation of foundations only, and cannot be utilized until Congress adopts a definite plan for the bridge at each locality. (Jan. 14, p. 31.) He further reports:

Plans for the Connecticut avenue bridge were submitted to Congress after receiving competitive designs, the design submitted by Mr. Geo. H. Morison being recommended by the Commissioners. For the Massachusetts avenue bridge two designs were submitted by the Chief Engineers, one for a masonry structure and one for a steel arch bridge, the number of spans in each of the two bridges being different, and, of course, the footings or foundations for the piers varying in number and position. No recommendation was made by the Chief Engineers, and no preference has been expressed by Congress. It will, therefore, be impossible to locate the points at which the foundations should be constructed until Congress decides upon the class of bridge to be built.

The work of laying foundations is now under advertisement, and it is proposed to execute a contract within the next 30 days, work on which will be commenced as soon as Congress indicates which plan it prefers.

The Engineer also states that the Navy Yard bridge should be replaced.

WHITEHALL, N. Y.—The Berlin Iron Bridge Co. of East Berlin, Conn., is erecting for the town of Whitehall, Washington Co., a riveted girder bridge having a span of about 70 ft. The bridge is of latticed girder type, with steel floor beams, and of a design to carry, besides ordinary traffic, the weight of a steel road roller.

WILKESBARRE, PA.—The Grand Jury has granted 46 bridges in various parts of Luzerne County, the total cost of which will be $23,235. There are to be 38 stone arch and eight iron bridges. M. L. Driesbach, County Clerk, Luzerne Co.; H. S. Smith, Engineer, 79 Coal Exchange, Wilkesbarre. (July 22, p. 537.)

YUMA, ARIZ.—The citizens of Yuma are endeavoring to have the Southern Pacific RR. bridge over the Colorado River built in such a manner as to admit of being used as a wagon bridge. The addition will cost between $10,000 and $15,000. D. K. Colburn, Superintendent of Bridges and Buildings, Southern Pacific, Houston, Tex.

MEETINGS AND ANNOUNCEMENTS.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7:30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month, except during July and August.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 7:30 p. m.

Engineers' Club of Columbus. (O.)—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburg, Pa., on the third Tuesday in each month at 7:30 p. m.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7:30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Chicago Electrical Association.

At a meeting of the Chicago Electrical Association, held Friday evening, Dec. 2, at Room 1741, Monadnock Block, Chicago, Mr. W. A. Harding, Master Mechanic and Electrician of the Calumet Electric Street Ry., presented a paper entitled, "Street Railway Engineering."

New York Railroad Club.

A regular meeting of the Club will be held at 8 o'clock p. m., Thursday, Dec. 15, at the rooms of the American Society of Mechanical Engineers, No. 12 West Thirty-first street, New York City. Mr. Angus Sinclair will address the meeting on the subject of "How People Travel in Europe." There will be no advance copies published.

Western Society of Engineers.

At a meeting of the Western Society of Engineers, Wednesday evening, December 7, in the Society Rooms, Monadnock Block, Chicago, the following papers were presented: "The Manchester Ship Canal," by Mr. Elmer L. Corthell; "The Mechanics of Suction and Suction Pipes," by Mr. Daniel W. Mead; "A New Stadia Diagram," by Mr. M. K. Trumbull.

American Society of Civil Engineers.

The forty-sixth annual meeting will be held at the house of the Society, 220 West 57th street, New York, on Wednesday and Thursday, Jan. 18 and 19, 1899. The business meeting will be called to order at 10 o'clock on Wednesday morning. The annual reports will be read, officers for the ensuing year elected, and other business transacted.

There will be a reception on either Wednesday or Thursday evening, and it is probable that, in accordance with the usual custom, the second day of the meeting will be devoted to an excursion to some point of interest. Ladies of the families of members will be welcome on the excursion and at the reception.

St. Louis Railway Club.

The programme for the meeting of the St. Louis Railway Club, Friday, Dec. 9, at the Southern Hotel, St. Louis, consists of a paper by Mr. W. E. Mumford, chemist of the Shickle, Harrison & Howard Iron Co., entitled, "The Laboratory; Its Relation to a Railroad." The following papers presented at previous meetings are announced for discussion: "The Performance of a Four-Cylinder Locomotive," by Prof. R. A. Smart; "Demurrage vs. Car Service Associations," by Mr. W. M. Prall; "Live Stock Traffic and Rates," by Mr. P. E. Hales.

In the evening the Club is to attend the Columbia Theatre, and afterward have a supper; this entertainment being provided by the Entertainment Committee.

Roadmasters' Association of America.

A meeting of the Executive Committee of the Roadmasters' Association of America was held in Chicago Nov. 22, and made up the list of subjects and of committees to report on them for the seventeenth annual convention. We give below the topics and the names of the chairmen of committees:

"Advisability of Increasing the Length of Rails, Using Miter Joints, and Determine the Difference in Expansion of Light and Heavy Rails," V. T. Douglass, Chairman, R. M., C. & O. RR., Richmond, Va. "Track Joints—Results Obtained from Use of Various Devices," P. Rockwell, Chairman, R. M., M. K. & T. RR., Sedalia, Mo. "Right of Way Standard Fences," J. A. Prentice, Chairman, R. M., L. S. & M. S. RR., Toledo, Ohio.

Paper—F. R. Coates, R. M., N. Y., N. H. & H. RR., Stamford, Conn.

"Best Method of Tamping Ties in Various Kinds of Ballast," embracing the following heads: First, Tamping all ties, including joint ties, with a shovel; second, tamping all ties, except joint ties, with a shovel, the joint ties to be pick tamped; third, tamping all ties with pick; fourth; tamping all ties with a bar," W. H. Courtney, Chairman, G. R. M., K. & W. RR., Osceola, Ia.

"Embellishment of Station Grounds," M. Sullivan, Chairman, R. M., M. C. RR., Niles, Mich.

Paper—"Standard vs. Compromise Cars, with Relation to Their Effect on Track," C. C. Dunn, Supt. A. C. L., Wilmington, N. C.

Committee to Arrange for Seventeenth Annual Convention—John Doyle, Chairman, Supt. Track, C. & W. M. RR., Grand Rapids, Mich.

Northwest Railway Club.

Brown's Discipline.—This was one of the principal topics discussed at the October meeting of the Northwest Railway Club, at St. Paul. Mr. E. A. Williams (M. St. P. & S. S. M.) read a paper describing the plan under which discipline is administered in the Mechanical Department of his road. On August 1, 1897, all credits for good records and debits for misconduct, etc., were erased, and each engineman in good standing received a credit equivalent to his term of service in months, a man, for instance, who had worked 10 years, receiving a credit of 120 months. If he should incur a debit, say for one month, it would reduce his credit to 119 months and reduce his seniority one month. For offenses meriting less than a month's penalty, reprimands are administered, and three of these in six months are equal to a debit of one month. Credits are based on punctuality, economy in fuel, oil and repairs, freedom from collisions due to trains breaking in two, freedom from disagreements with other employees who are not subordinate to engineers, non-affiliation with labor organizations under whose by-laws strikes can occur, and the other usual acts or conditions. There is a formidable list of offenses which, when they cause damage, cannot be offset by credits. Mr. Williams says that after an experience of nearly three years with the credit and debit system he believes it is the only proper discipline.

Mr. J. H. Goodyear (C. G. W.) spoke of his experience with discipline by suspension, by fines and by the Brown system, which latter, however, appears to have been administered on his road without credits of any kind. Mr. Goodyear believes that fines do more harm than good. He thinks that the cash premium given by Mr. Brown on the Fall Brook ($60 a year to each freight conductor making a perfect record) is undesirable, as it opens the door to

"crooked work." On the Chicago Great Western, where the credit feature was soon given up, the number of enginemen on the rolls during the past three years has been 243, and 211 of these have been disciplined. The number of marks or days recorded against these men is 10,870. The highest number of days recorded against any one man is 210, and the average per man 51.5. At $3.70 a day these suspensions would have amounted to an average of $190.60 saved by each man; but this, says Mr. Goodyear, is probably not fair, as, with actual suspension in vogue, some of the less serious offenses in this list would not have been punished. Mr. Goodyear seems to think that the abolition of suspensions is a good thing, whatever the defects of the present plan. But, with no credit side, some of the men gradually pile up big debits against themselves; and, seeing what is coming, they quit their jobs. When the water reaches up to the chin they obtain employment elsewhere before they drown. Mr. Goodyear sent a circular to 200 of his men and received 100 answers, and it appears that the majority of the hundred preferred actual suspension, with its attended evils, to the system under which they are now working; but all of them would be in favor of the debit and credit system.

Mr. Williams says that the 160 enginemen on his road all appear to favor Brown's plan.

PERSONAL

—Mr. Chas. P. McFaddin, the General Ticket Agent of the Manhattan Elevated, New York, died in Long Branch, N. J., at the age of 56.

—Mr. David McCargo, who was forced to resign his position as General Superintendent of the Allegheny Valley, on account of the effects of a paralytic stroke, has been Superintendent of that road for about 25 years.

—Mr. F. O. Melcher, who was recently appointed Division Superintendent of the Fitchburg, has been Chief Engineer of that road since 1887. He is a graduate of Tufts, and a member of the American Society of Civil Engineers.

—Mr. P. F. Hodgson, who has occupied the position of Signal Engineer, with headquarters at Toronto, Ont., has been appointed Secretary and Manager of the Saxby & Farmer Co., of London, England.

—Mr. Daniel D. Davis, Auditor of the Toledo, St. Louis & Kansas City, died in Grand Rapids, Neb., Nov. 29. He had been connected with that road since 1887. Previous to that year, he had been in the accounting department of several Vanderbilt roads. He was 56 years old.

—Mr. J. Taylor Gause, President of the Harlan & Hollingsworth Co., the ship and car building firm of Wilmington, Del., died in Wilmington, Dec. 1 He was born in 1823, and began to work for the Harlan & Hollingsworth Co. when he was 20 years old. He began as errand boy and steadily advanced until he became President of the corporation.

—Col. James Francis, Consulting Engineer of the Locks & Canals Co., died in Lowell, Mass., Dec. 1. He was appointed an Engineer of the Hoosac Tunnel in 1865. A year afterward he became Assistant Engineer for the Locks & Canals Co., remaining in that capacity until 1885, when he became its Agent and Engineer. Two years ago he was made its General Agent and Consulting Engineer, which position he held until his death.

—Mr. Robert B. F. Pierce, whose resignation of the Receivership of the Toledo, St. Louis & Kansas City was noticed last week, died suddenly at his home in Indianapolis, Ind., Dec. 5. He resigned the Receivership of that road on account of ill health, but maintained the less trying position of General Manager of the Indiana, Decatur & Western. He was born in Laurel, Ind., in 1843, and served in the army in the civil war. In 1880 he was elected a member of Congress.

—Mr. Charles E. Webster, Chief Engineer of the Lehigh Valley, has announced his intention to resign at the end of this month. He has occupied this position since 1891. For two years previous he was Chief Engineer of the Schuylkill & Lehigh Division of the Lehigh Valley. He was born in 1842 at Mauch Chunk, Pa., and is a graduate of Princeton University. He entered the railroad service in 1862 as a rodman, and was afterward Assistant Engineer of the Lehigh & Susquehanna Division. He remained in that capacity until 1868, when he became an Assistant Engineer of the Boston & Erie RR. in Connecticut, remaining there for two years. In 1870 he was appointed an Assistant Engineer of the Chesapeake & Ohio. For 15 years Mr. Webster was associated with several prominent railroad systems in an engineering capacity, after which, in 1885, he was appointed an Assistant Engineer in the building of the Croton Aqueduct of New York City. He left that position in 1886 to become Division Engineer and Principal Assistant Engineer of the St. Louis & San Francisco. Three years afterward he became connected with the Lehigh Valley.

—In our issue of Nov. 25, page 861, appeared a brief note announcing the death of Sir John Fowler, with a few words about his life and work. The English technical papers now received give fuller particulars than we could then command. He was born July 15, 1817, and entered the engineering profession through the only door then open to an Englishman, namely, by apprenticeship to a practicing engineer. He had little of what we understand now as technical education. Nevertheless, in 1843, when he was only 26 years old, he had been resident engineer, engineer, manager and locomotive superintendent of the Stockton & Hartlepool Railway. About that time he started in private practice as a consulting engineer, and within the next few years he was associated with an immense number of railroad schemes, most of which were carried out. Among these were the original London Underground, or Metropolitan, the Victoria Station & Pimlico Railway, on which the first railroad bridge over the Thames was built; the Manchester, Sheffield & Lincolnshire, the Severn Valley, the Mid Kent, the London, Tilbury & South End, the Great Northern, the Southern & Western of Ireland, the Great Eastern extension in Cambridgeshire and Essex, etc. He was connected also with the building of the Millwall docks and with river and harbor improvements and schemes for the reclamation of land from the sea. The Metropolitan Railway was his most important work up to 1862. This involved not only engineering skill, but great business skill and tact. In connection with the railroad system of India he did invaluable work, and one of his most important achievements was securing the gage of 3 ft. 6 in., instead of 2 ft. 9 in. for the minor lines. As consulting engineer to the Khedive of Egypt he had to do with the improvement of the irrigation system and with the plans for the Soudan Railroad, which is at last to be carried out, although not on Fowler's lines. In partnership with Sir Benjamin Baker he built the Forth Bridge, and in recent years he has been active in consultation in the affairs of the City & South London Railway, the Waterloo & City and the Central London. He was a man of great bodily and mental strength and energy, and his distinguished career was in spite of and not because of the early disadvantages of lack of scientific training. But to the last he regarded practical training of the engineering student as most essential, and stipulated for a five-years' apprenticeship to follow the technical college education.

ELECTIONS AND APPOINTMENTS.

Allegheny Valley.—Owing to the continued illness of David McCargo, General Superintendent, his resignation is announced. Chas. B. Price, heretofore Division Superintendent, has been appointed Acting General Superintendent, succeeding Mr. McCargo. His headquarters are at Pittsburgh, Pa.

Baltimore & Ohio.—The following changes, effective Dec. 1, have been made: P. J. Harrigan has been appointed Division Master Mechanic, Middle Division, with headquarters at Cumberland, Md., vice Mr. D. C. Courtney, resigned. David Witherspoon has been appointed General Foreman at Connellsville, Pa., vice Mr. P. J. Harrigan, promoted. J. F. Bowden has been appointed General Foreman at Trinidad, near Washington, vice J. E. Hobbs, assigned to other duties.

Thomas R. Bennis, heretofore Assistant to the General Freight Agent, has been appointed General Agent, with headquarters at Denver, Col. His territory includes Colorado, Wyoming, Utah, Montana and New Mexico.

Bear Rock.—The annual meeting of the stockholders of this company was held in Johnstown, Pa., Dec. 1. The following Board of Directors was elected: John Murdock, J. M. Murdock, W. F. Murdock, John Fox, J. C. Duncan and E. B. McColly. The officers chosen were John Murdock, President; J. M. Murdock, Treasurer, and W. F. Murdock, Secretary, all with headquarters at Johnstown, Pa.

Bessemer & Southwestern.—E. B. Thomasson has been elected Secretary and Treasurer, succeeding J. K. Dimmick. Mr. Dimmick has been appointed Superintendent, succeeding M. J. Boots. Mr. Dimmick's headquarters are at Bessemer, Ala.

Boston & Maine.—C. J. Wiggin has been appointed General Baggage Agent, succeeding O. W. Greely. His headquarters are at Boston, Mass.

Central of Georgia.—L. R. Van Diviere, Commercial Agent at Macon, Ga., has been transferred to Savannah, Ga., succeeding John F. Burns. J. G. Carlisle has succeeded Mr. Van Diviere as Commercial Agent at Macon. Mr. Carlisle was heretofore Traveling Passenger Agent at Macon.

Chicago Great Western.—C. E. Slayton, who was recently appointed Division Master Mechanic, was heretofore Assistant Master Mechanic, with jurisdiction extending over the entire system. Recently the company decided to divide the territory, and has appointed three Division Master Mechanics. Mr. Slayton was assigned to the Eastern Division, Oelwein to Chicago, including Oelwein.

Chicago, Milwaukee & St. Paul.—W. J. Underwood, Assistant General Superintendent, has been transferred from Milwaukee, Wis., to Minneapolis, Minn., succeeding D. L. Bush, Assistant General Superintendent, who has been transferred to the place of Mr. Underwood at Milwaukee.

Chicago, Rock Island & Pacific.—C. A. Searle has been appointed General Excursion Agent, with office at Chicago, succeeding E. W. Thompson. Frank L. Miller has been appointed Traveling Passenger Agent, with headquarters at Chicago, succeeding C. J. Rupp.

Chicago, St. Paul, Minneapolis & Omaha.—The headquarters of the Sioux City Division have been changed from Mankato, Minn., to St. James, Minn.

Cleveland, Cincinnati, Chicago & St. Louis.—Joseph Keavy, now Division Freight Agent at Benton Harbor, Mich., will be made Assistant General Freight Agent, with headquarters at Indianapolis, Ind., Jan. 1. This appointment fills the vacancy in the Freight Department at Indianapolis made by the resignation of W. A. Sullivan. (Nov. 11, p. 819.)

Corvallis & Eastern.—The general offices of the company, heretofore located at Corvallis, Ore., have been recently removed to Albany, Ore.

Fitchburg.—F. O. Melcher, Chief Engineer, has been transferred to other duties, and A. S. Cheever succeeds him; effective Dec. 1. His headquarters are at Fitchburg, Mass.

F. O. Melcher has been appointed Superintendent of the Fitchburg Division, with headquarters in Boston.

Fremont, Elkhorn & Missouri Valley.—J. F. Cleveland has been appointed Land Commissioner, with office at Chicago, Ill., succeeding Chas. E. Simmons.

Genesee & Wyoming Valley.—D. Hyman has been appointed Receiver of this company, with headquarters at Retsof, N. Y.; effective Nov. 15.

Grand Trunk.—W. H. Patton of Montreal has been appointed Signal Engineer, with headquarters at Toronto, Ont. He succeeds P. F. Hodgson, resigned. The appointment takes effect Jan. 1.

Great Northern.—R. E. Williams has been appointed Chief Train Dispatcher of the Montana Division, with headquarters at Havre, Mont.

F. M. Studley, who has been General Agent at St. Paul, Minn., has resigned to become Seattle Agent of a Pacific steamship company. His successor is C. D. Thompson, heretofore Traveling Freight Agent at St. Paul.

Kansas City, Fort Scott & Memphis.—Robert R. Hammond, heretofore Division Superintendent at Springfield, Mo., has been appointed General Superintendent of the K. C., F. S. & M., Kansas City, Memphis & Birmingham, Kansas City, Clinton & Springfield, Current River, and Kansas City Ry. & Bridge Co. His headquarters will be at Kansas City, Mo. The office of Superintendent of the lines west of the Mississippi River has been abolished.

The Memphis lines will be operated in two divisions: the lines east of Springfield, Mo., will be known as the Eastern Division, and will be in charge of Supt. J. H. Sullivan, with office at Memphis, Tenn. Mr. Sullivan was heretofore Superintendent of the Kansas City, Memphis & Birmingham. The lines west of Springfield, Mo., will be known as the Western Division, and will be in charge of Supt. H. S. Mitchell, with office at Fort Scott, Kan. Mr. Mitchell was heretofore Division Superintendent at Fort Scott, Kan. These changes necessitate the retirement of Superintendent J. H. Emmert, whose headquarters have been at Kansas City, Mo. Daniel Bontecou, Chief Engineer at Kansas City, Mo., has been relieved of the charge of Maintenance of Way, water supply, fences and buildings, which will hereafter be under the charge of R. R. Hammond, General Superintendent.

Lake Shore & Michigan Southern.—J. R. Reniff has resigned as Master Car Builder at Norwalk, O., and the position has been abolished.

Lehigh Valley.—Charles E. Webster, Chief Engineer at South Bethlehem, Pa., has resigned, to take effect Jan. 1, 1899.

Louisville & Nashville.—D. J. Brumley, Assistant Engineer in charge of the work in progress on the Memphis branch from Bowling Green to Memphis, Tenn., has been appointed Engineer in charge of masonry construction, with headquarters at Louisville, Ky. Wm. B. Tabb succeeds Mr. Brumley at Clarksville, Tenn.

Louisville & Nashville Terminal (L. & N.).—At a meeting of the stockholders, held in Nashville, Nov. 22, the following directors were elected: M. J. Smith, H. W. Brice, C. Quarrier, J. H. Ringgold and N. H. Ready.

Mobile & Ohio.—J. J. Webster has been appointed Traveling Freight Agent, with headquarters at 215 North Fourth St., St. Louis, Mo.

Nashville, Chattanooga & St. Louis.—The office of Assistant General Freight Agent, heretofore held by John F. Connor, has been abolished. Mr. Connor will assist the Traffic Manager and General Freight Agent. O. T. Ambrose has been appointed Commercial Agent, with headquarters at Atlanta, Ga.

Norfolk & Western.—Thomas L. Collings has been appointed Commercial Agent, with office at Memphis, Tenn., succeeding J. H. Turner.

Northern Pacific.—In a circular issued by Chas. Russell, Division Superintendent at Missoula, Mont., announcement is made that M. Skones is appointed Roadmaster, with headquarters at Garrison, Mont. He also has jurisdiction over the Marysville branch, succeeding B. E. Palmer, and the Montana Union branch, succeeding J. C. Flint.

Ogdensburg & Lake Champlain.—At a meeting of the Directors held in New York, Dec. 1, the following new Directors were elected: George Sherman, John M. Graham and Cyrus J. Lawrence. The old officers were re-elected.

Oregon Short Line.—J. Beck has been appointed Chief Train Dispatcher of the First and Second Districts of the Idaho Division, with headquarters at Kemmerer, Wyo.

Pacific Coast.—Following the annual meeting of the stockholders, held in New York Nov. 4, the resignation of C. J. Smith as General Manager is announced, to take effect immediately. (Dec. 2, p. 867.)

Pennsylvania.—The freight and passenger agencies at San Francisco, Cal., heretofore in charge of Wm. BeDell, have been consolidated, and Mr. BeDell has resigned. A. S. Holt has been appointed Pacific Coast Agent, succeeding him.

Pennsylvania Co.—Wm. Murdock has been appointed Assistant Engineer Maintenance of Way of the Toledo Division, with headquarters in Toledo, O.

Rutland.—The directors in Rutland, Vt., Dec. 1 elected Dr. W. Seward Webb, E. V. W. Rossiter and Geo. Bird directors, succeeding David Wilcox, Chester Griswold and Chas. A. Walker. The directors who resigned represent the Delaware & Hudson, while Messrs. Webb and Rossiter are closely connected with the New York Central.

St. Louis, Iron Mountain & Southern.—J. T. Stafford, heretofore General Foreman of Locomotive Repairs at Baring Cross, Ark., has been appointed Assistant Master Mechanic, with headquarters at the same point.

St. Louis Southwestern.—T. E. Jarrett has been appointed Assistant Superintendent of Bridges and Buildings, with headquarters at Pine Bluff, Ark., succeeding Wm. Quinn.

Shawnee, Guthrie & Northwestern.—The officers of this recently incorporated road, referred to in the Construction column, are: Henry Hudson, Chicago, President; H. L. Miller, Guthrie, Vice-President; A. H. Humphrey, Guthrie, Secretary; J. W. McNeal, Guthrie, Treasurer. Directors: Henry Hudson, Chicago; J. W. McNeals, J. M. Brooks, A. H. Humphrey, Frank H. Greer, W. D. Coyle and H. L. Miller, Guthrie, and W. S. Search, Shawnee.

Southern.—D. W. Newell has been appointed Trainmaster at Asheville, N. C., succeeding J. A. Droege, resigned. J. B. Gannon has been appointed Trainmaster at Charlottesville, Va., succeeding J. E. McCarthy, transferred.

L. L. McCleskey has been appointed Division Freight Agent, with office at Atlanta, Ga. The position of Assistant General Freight Agent of the Souhern, lately held by Haiden Miller, resigned, has been abolished. Mr. McCleskey succeeds to the position vacated by Mr. Miller. A. E. Bouldridge has been appointed Master Mechanic at Louisville, Ky., succeeding J. B. Gannon. Mr. Bouldridge was heretofore General Foreman of the Mechanical Department at Atlanta.

Toledo, St. Louis & Kansas City.—H. O. Reed has been appointed Auditor, succeeding Daniel D. Davis, deceased. His headquarters are at Toledo, O.

Union Pacific.—The Board of Directors has abolished the office of Chairman of the Board on the recommendation of its incumbent, Winslow Pierce, who is also General Counsel for the company.

Patrick Stack has been appointed Foreman of the shops at Laramie, Wyo. Wm. Daley, Assistant Train Dispatcher at Laramie, has resigned.

Wabash.—Geo. S. McKee, Master Mechanic of the Western Division at Moberly, Mo., has been transferred to the Eastern Division, and his supervision extended to include the Buffalo Division. His headquarters are at Fort Wayne, Ind. C. H. Doebler, heretofore Master Mechanic at Fort Wayne, Ind., has been transferred to the Middle Division, with headquarters at Springfield, Ill. G. W. Mudd, heretofore Master Mechanic at Springfield, Ill., has been transferred to the Western Division, with headquarters at Moberly, Mo., succeeding Mr. McKee.

Wellington & Powersville.—C. E. Branning has been lately appointed Superintendent, with office at Branning, N. C. The office of Superintendent, heretofore at Edenton, N. C., has been transferred to Branning, N. C.

West Branch Valley.—The officials of this company, referred to in the Construction column, are: President, A. E. Patton, Curwensville, Pa.; Vice-President, H. B. Powell; Secretary, William F. Patton; Treasurer, Fred. J. Dyer; Engineer, A. V. Hoit, Phillipsburg.

West Virginia Central & Pittsburgh.—George W. Harrison, Jr., Cashier at Elkins, W. Va., has resigned. The offices of Cashier and Paymaster have been consolidated, with Hopewell Hebb, heretofore Paymaster, in charge of the consolidated offices. His headquarters are at Elkins, W. Va.

RAILROAD CONSTRUCTION,
New Incorporations, Surveys, Etc.

ALAMEDA & SAN JOAQUIN.—It is reported that this company has purchased three acres of land about three miles west of Banta, Cal., to put in switches to connect with the Southern Pacific.

ARKANSAS, GUTHRIE & CALIFORNIA.—This company is being organized in Oklahoma with a capital stock of $50,000, with the following officers and Directors: President, Henry Hudson, Chicago; Vice-President, H. L. Miller, Guthrie; Secretary, A. A. Humphrey; Treasurer, J. W. McNeal. These, with J. M. Brooks, Frank Greer, W. H. Coyle and S. W. Search, at Shawnee, O. T., form the Board of Directors.

ATCHISON, TOPEKA & SANTA FE.—Preliminary surveys are reported completed for the extension of the Santa Rita branch to Hanover. The first 4½ miles of the line was completed last summer. (June 17, p. 444.)

An official of the company is reported to have stated that about three miles of track would be built at San Diego, Cal., to accommodate the Western freight traffic.

ATLANTIC COAST LINE.—Roadbed improvements between Petersburg, Va., and Stony Creek, Va., are in progress. It is supposed the work will be completed by May 1, 1899.

BELLAIRE, ZANESVILLE & CINCINNATI.—Regarding the reports that this road will be converted to standard gage from Woodsfield to Bellaire, O., we are officially informed that no arrangements have been completed for doing this work, and it is not likely that anything will be done in the immediate future.

BRAINERD & NORTHERN MINNESOTA.—Track is reported laid into Bemidji on the new Fosston branch of the Great Northern, completing the extension from Walker, Minn., northwest 31 miles to Bemidji. (Oct. 14, p. 750.)

CANADIAN ROADS.—Messrs. Tupper, Peters & Potts, Solicitors, of Victoria, B. C., give notice that application will be made to the Provincial Legislature for a charter to build a line from Golden, B. C., on the main line of the Canadian Pacific, to run southeast about 150 miles to Cranbrook, on the new Crow's Nest Pass extension of the C. P. R.

CENTRAL ONTARIO.—The municipality of Bancroft, Ont., has voted a bonus of $2,500 for the proposed extension from Coe Hill north 18½ miles to Bancroft. (July 15, p. 522.)

CENTRAL PACIFIC.—The City Council of Oakland, Cal., has granted this company the right to build two spur tracks, being extensions of the spurs connecting the main track near the intersection of First and Franklin Sts. The ordinance does not permit the tracks to exceed 450 ft. in length.

CHICAGO & NORTHWESTERN.—The company is reported to have 300 teams at work on the grade from Denison, Ia., northeast about 80 miles to Algona. The city of Algona has appointed a committee of business men to confer with the company as to aid from that city.

CHICAGO, ROCK ISLAND & PACIFIC.—Official confirmation is received that surveys are in progress for an extension from Rose Hill, Ia., north about 60 miles to Marshalltown. The company has not yet determined to build the line, but will probably do so if conditions later seem to warrant. (Nov. 25, p. 852.)

CHICAGO TERMINAL TRANSFER.—Surveys are reported in progress for an extension from Harvey, near Chicago, to Chicago Heights.

CHOCTAW, OKLAHOMA & GULF.—Chancellor T. B. Martin, at Little Rock, Ark., Dec. 1, delivered an opinion enjoining the St. Louis, Iron Mountain & Southern from building a line over a section of the proposed road of the C., O. & G. to Little Rock. The opinion declared forfeited through non-use the rights acquired by the Iron Mountain through its survey of 1887. Opinion is not passed on the right of the Iron Mountain to build a parallel line.

J. T. Cullens of St. Louis, Mo., has received the contract for the masonry on the entire line of the Choctaw & Memphis extension to Little Rock, Ark. Johnston Bros. & Faught of St. Elmo, Ill., have let sub-contracts for their section of the road from Howe, Ind. Ter., east 100 miles, as follows: M. A. Wogans, St. Joseph, Mo.; Mike Tansy, St. Louis, Mo.; W. M. Powell, Oklahoma City; Jake Collins, Kansas City; A. G. Brown, St. Elmo, Ill.; D. R. Morris, Beloit, Kan., and Walsh Bros., St. Elmo, Ill. The control of the town sites was let to Edward Kennedy of Fort Smith, Ark. All contracts are to be completed within six months.

COLORADO & NORTHWESTERN.—Grading was completed Nov. 28, on a short spur to the Big Five Mines at Frances, Col., and track laying was to be finished last week. The work was very difficult, mostly rock. The maximum grade is 4%, and the maximum curve 30°. A branch has been surveyed to El Dora, Caribou and Nederland, but no further work will be done in the vicinity until business justifies extensions. (Official.)

COPPER RANGE.—This is the name of the company being organized to build a railroad from Houghton, Mich., to run southwest about 60 miles to Rockland on the Chicago, Milwaukee & St. Paul. (New Roads, Oct. 28, p. 786.) Surveys are in progress over the proposed route. Paine, Webber & Co., bankers and brokers, 27 State St., Boston, are interested. (Official.)

CUBAN ROADS.—The American Indies Co. of 100 Broadway, New York, is reported to have received a contract from the United States Government for a wharf at Triscornio, in the harbor of Havana, and for a railroad connecting the Matanzas United R.R. with the military camp at Regali, seven miles. The Havana end of the line will be double-tracked.

In his annual report, Secretary of War Alger recommends that the Government build a railroad in Cuba to connect the two ends of the island, with branch roads to the leading cities of the coast. He says:

Such a road would, of course, cost a large sum, perhaps $20,000,000, but it would give employment to the people of Cuba, teach them habits of industry, be an inducement for them to cultivate their farms, and thus furnish supplies for the laborers and for market when the road is constructed. This, in my judgment, is absolutely essential to the pacification and development of that great island. It will bring its minerals, lumber and agricultural products to market and open up communication with all parts of the island with the least possible delay. The road would be a good property, and when it had served its purpose for the Government could be sold for its cost. If such an improvement is not made the Government will no doubt expend fully that amount in charity. Even if this road be built, there is immediate necessity for a large appropriation to relieve the destitute. Many of the Cubans have no means of support, no homes, little clothing, no animals for farming and no seed for planting. (Oct. 21, p. 768.)

DETROIT & MACKINAC.—The Michigan Railroad Commission has approved the map for the proposed extension of this line northwest to Cheboygan. (Nov. 4, p. 804.)

DULUTH & NORTHEASTERN.—Eighteen miles of roadbed is completed, and tracklaying is in progress on this line from a point on the Duluth & Iron Range, near Bassett Lake, to run southeast about 36 miles to Island Lake, on the Colquet River. Frederick Weyerhaeuser of St. Paul, Minn., is back of the project.

EDMONTON DISTRICT.—Application will be made at the next Dominion session for an act to build a railroad through Yellow Head Pass, B. C., or Peace River Pass to the Pacific Coast, and to change the name of the line to the Edmonton, Yukon & Pacific Ry.

ELLAVILLE, WEST LAKE & JENNINGS.—About eight miles of new road will be built next year. No contracts as yet have been let, but about four miles of the rails are bought. E. E. West of Westlake, Fla., is President. (Nov. 25, p. 852.)

GEORGIA & ALABAMA.—(See Railroad News column.)

GREAT NORTHERN.—According to Tacoma, Wash., dispatches, this company is preparing to extend its line south from Spokane through Tacoma to Portland, Ore., requiring about 175 miles. It is stated that the old grade made by the Union Pacific in 1890 will be utilized.

GUADALUPE VALLEY.—Grading is reported completed to within six miles of Yoakum, Tex., on the line now building from Alligator Head to Yoakum, 78 miles. It is stated that rail laying will be begun about Jan. 1. (Oct. 27, p. 786.)

HONESDALE, SCRANTON & EASTERN.—Press dispatches from Scranton, Pa., report that a company is being organized under this name in Pennsylvania, with a capital stock of $9,000,000, to build a coal road from a point on the Lackawanna River, near Honesdale, to run east to the Delaware River at or near the aqueduct on the Delaware & Hudson Canal, and thence across the lower end of New York state to Rondout, on the Hudson River, 138 miles. This would require a tunnel through the Moosic Mountains, near Honesdale, for which a contract is said to be under consideration with the London Construction Co. This line may be projected to form a part of the proposed coal road from Scranton to tidewater.

HUTCHINSON & SOUTHERN.—Surveyors are reported at work running lines from Blackwell, Okla. Ter., southeast about 12 miles to Ponce City, on the Atchison, Topeka & Santa Fe. It is stated that the company contemplates building, within the next 90 days. The road was extended from Medford east 25 miles to Blackwell early this year. (March 25, p. 224.)

IDAHO NORTHERN.—This company has been incorporated in Idaho, with a capital stock of $2,500,000, to build a line from the mouth of the Cœur d'Alene River, along that river to the North Fork and Pritchard Creek, via Murray, to the head waters of Bear Gulch. Another line is projected up Beaver Creek from the junction of the Pritchard and the head waters of Beaver, with a branch up Carbon Creek to its head. The incorporators and Directors are: W. Thomas Hart of Weiser; Bamford Robb, Portland, Ore.; Joseph Perrault, Alfred Eoff and Bamford A. Robb of Boise. The principal office is Boise. There is apparently no connection between this company and the company of the same name incorporated in Idaho in January last. (Jan. 11, p. 34.)

ILLINOIS CENTRAL.—The proposition which Stuyvesant Fish, President of the I. C., made to the Orleans Levee Board and the New Orleans City Council, regarding the right of way to lay tracks along the river front, has been rejected. In the report stating the objection, the chairman of the committee to which the application had been referred says that, after considering it, the conclusion was reached that the illegal features contained in the proposition would have to be eliminated before they would further consider it.

The Fort Dodge & Omaha extension from Fort Dodge, Ia., southwest to Council Bluffs will be 128 miles long. James H. McShane & Co. of Omaha have the contract for 16 miles from Council Bluffs to Loveland. (Dec. 2, p. 868.)

KANSAS & SOUTHERN.—This company was incorporated in Kansas Dec. 3, with a capital stock of $100,000, to build a line nine miles long in Pottawatomie County. The Directors are: Irving H. Wheatcroft, St. Louis; C. B. Holmes, New York; A. J. Clark, New Orleans; George C. Moore, Montreal, and J. L. Rodgers, J. K. Codding and T. R. Cave, Westmoreland.

KANSAS, OKLAHOMA CENTRAL & SOUTHWESTERN.—Work is suspended for the winter on this line from Cherryvale, Kan., south via Guthrie, El Reno and Fort Sill, Okla., to Vernon, Tex. Grading is completed from the Horse Pen coal fields through Bartlesville, Ind. Ter., and across the State line into Kansas, near Caney. J. H. Bartles of Bartlesville, Ind. Ter., is President, and the Knickerbocker Trust Co., New York, its Eastern representative. (Aug. 26, p. 619.)

LEHIGH VALLEY.—It is reported that the company has decided to double track all the way over the Wilkesbarre mountain. This is the only portion of the Lehigh Valley between Jersey City and Buffalo that is not double tracked. It is only a short distance, but it is expected the expense will be heavy, requiring extensive cutting and filling.

Official denial is made that this company contemplates making an extension of its line to Lockport, N. Y., at the present time. Dec. 2, p. 868.)

LITCHFIELD, CARROLLTON & WESTERN.—Press reports state that Johnston Bros. & Faught of St. Elmo, Ill., who bought this road at foreclosure sale Nov. 26, will extend it northeast 75 miles to Quincy, and east via Coffeen to St. Elmo, Ill. It is stated that surveys have been made and the right of way bought for part of the way. The present road runs from Columbiana, Ill., east 51.5 miles to Burnett. (Railroad News column, Dec. 2, p. 870.)

MEXICAN ROADS.—Ramon Miranda y Marron has been granted a concession by the Mexican Government to build a line in the State of Mexico from Colonia, near Mexico City, on the Mexican National, via Molino del Rey, Sotelo, Prieto and Blanco to Tacuba. The concession carries no subsidies as to exemption from taxes and import duties. Two kilometers must be built within the first two years, and the line finished in five years.

Manuel Arreguilaga has received a concession from the Mexican Government to build a road from Merida, Yucatan, northwest to a point in the district of Hunucma in the same state.

E. B. Mayo of Hornos, Coahuila, Mexico, has a concession to build a road from that place south to the Hacienda Hornos, which will later be extended to Viesco, 26 km. (16 miles).

MINNEAPOLIS RAILWAY TERMINAL.—This company is incorporated, with a capital stock of $100,000, to build terminals in the city of Minneapolis. The incorporators are: W. D. Washburn, John S. Pillsbury, M. B. Koon, C. H. Pettit and W. D. Hale, who also form the first Board of Directors. Press reports state that the company has bought a strip of land, half a block wide, fronting east on Second street north from the railroad tracks, extending north to Tenth avenue.

MOORE COUNTY & WESTERN.—Grading is completed for nearly eight miles on this line from Aberdeen, N. C., through Craigrownie to Concord, 87.5 miles. Tracks are to be laid soon for 30 miles more. It is expected that nine miles of track will be required within the next two months. M. C. Wadsworth of Concord, N. C., is President. (July 29, p. 555.)

NEW ROADS.—The Wyoming Land, Iron & Coal Co., of which E. H. Saltiel of Rawlins, Wyo., is President, is making negotiations with contractors for building a railroad from Iron to a point on the Union Pacific main line between Fort Steel and Rawlins, 22 miles. The first 17 miles will run over a flat, sage brush, alkali desert, with a low grade. No bridges will be required. (Nov. 18, p. 838.)

The Embreeville Furnace Co. is building a road three miles long from Roan Mountain, Penn., on the East Tennessee & Western North Carolina, to the company's ore beds. J. F. Huddle is in charge of the work.

Grading is reported in progress for the line of DuBois & Hoover from Glen Campbell, Pa., on the Pittsburgh & Eastern line of the Pennsylvania, to run up the south branch of Cush Creek, six miles to the company's timber tract on the Little Mahoning.

The Beaver Coal Co., recently incorporated in Coos Co., Ore., with a capital stock of $1,000,000, proposes to build a railroad in Coos Co., to run from a point on the Coquille River, north to a point on Coos Bay, at or near Empire City. This proposed line is in the territory of the Coos Bay, Roseburg & Eastern.

R. J. Sledge of Kyle, Tex., is said to be at the head of a project to build a railroad from Victoria, Tex., to Brazoria, Bay City, Angleton and other towns in Texas. Heber Stone, a banker of Brenham, is also said to be interested.

Arrangements are completed for building a narrow gage line next summer from Truckee, Carson County, Cal., on the Southern Pacific to run south 15 miles to Tahoe City. D. L. Bliss, who owns the Lake Tahoe summer resort, will furnish the capital.

NEW YORK & PENNSYLVANIA.—Theodore Cobb of Spring Mills, N. Y., is reported to have been awarded a contract for building an extension of this line from Oswayo, Pa., west six miles to Millport. The stockholders decided to increase the bonded indebtedness for this extension last year. (July 22, p. 538.)

NORTHERN PACIFIC.—Wren & Greenough, of Montana, are reported to have the contract for the proposed line from Lewiston, Idaho, east 75 miles, toward Missoula, Mont., on the Clearwater extension. (Nov. 25, p. 852.)

NORTH SHORE TERMINAL.—This company was incorporated in Pennsylvania Nov. 30, with a capital stock of $100,000, to build a line from Allegheny City, to connect with the Pittsburgh, Fort Wayne & Chicago, and the Pittsburgh & Western. The directors are: Chas. T. Schoen, President, Bryn Mawr; F. N. Hoffstat, Allegheny; W. H. Schoen, W. Hilderbrandt and G. T. Hilderbrandt, Pittsburgh.

OMAHA BRIDGE & TERMINAL.—The Omaha Council has given permission to this company to extend its line down Fourteenth St., and it is reported to be the intention of the company to push the building this winter. (Nov. 11, p. 820.)

OREGON RAILWAY & NAVIGATION.—New articles of incorporation were filed at Olympia, Ore., Nov. 21, for the building of new lines as follows:

First, a line from Portland, Ore., to Huntington, Ore.; second, a line from Umatilla Junction, Ore., via Wallula Junction, to Walla Walla, Wash.; third, a line from Pendleton, via Walla Walla, to Spokane; fourth, a line from Willows Junction to Heppner; fifth, a line from Bolles Junction, Wash., to Dayton; sixth, a line from Walla Walla to Dudley and Dixie, Wash.; seventh, a line from Cornell Junction, Wash., via La Crosse Junction, to Moscow, Idaho; eighth, a line from Starbuck to Pomeroy; ninth, a line from East Portland to Albina; tenth, a line from La Grande to Elgin; eleventh, a line from Winona Junction to Seltice, Wash.; twelfth, a line from Tekoa to Mullan, Idaho, with a branch from Wallace to Burke; thirteenth, a line from the Lower Cascades, in Washington, to the Upper Cascades; fourteenth, a line from Portland, Ore., via such route as may be selected by the Board of Corporation to a point at or near the mouth of the Columbia River, on either the north or south side of the river; fifteenth, a line from Dayton to a point at or near Delancy, Wash.; sixteenth, a line from Moscow, Idaho, to or near Lewiston; seventeenth, a line from a point at or near Biggs Station, Ore., toward or to Prineville; eighteenth, a line from Elgin, Ore., toward or to Wallowa.

The company is also authorized to acquire the properties of the present company of the Cascades, the Walla Walla & Columbia, the Columbia & Palouse, the Oregon Railway Extensions, the Washington & Idaho and the Mill Creek, Flume & Manufacturing. The principal place of business is Portland, Ore. The capital stock is $35,000,000, of which $11,000,000 is first preferred, entitling the holders to 4 per cent. per annum dividends.

PENNSYLVANIA.—In addition to the improvements already noted, maps of which have been given, this road has opened for traffic the new line between Lilly and Wilmore. It is a stretch of 1.3 miles. Another section of about two miles was opened on Dec. 5.

It is reported that contracts amounting to $1,000,000 have been let. Among the projected improvements is a complete changing of the line east of Kinzer's, the building of a second additional track east from Elizabethtown, relaying No. 1 track from Johnstown bridge to Sheridan and laying an additional track from Sang Hollow to Conemaugh. The Kinzer's contract was awarded to Drake & Stratton for $212,000. S. Kerbaugh received the contract for the Johnstown section, which cost $80,000, while John Keller, of Lancaster, Pa., secured the work of building the additional track east from Elizabethtown, and Patricus McManus, of Philadelphia, the work from Sang Hollow to Conemaugh. It is proposed by these improvements to straighten out a number of bad curves in the roadway and thus greatly shorten the main line. Work on the improvements will be started immediately.

ST. JOSEPH & GRAND ISLAND.—Preparations are being made to build the terminals at Kansas City, Mo. The company, as previously stated (July 22, p. 539), has trackage rights into the city over the Kansas City, Pittsburgh & Gulf, and a cut-off is being built from Gower, Mo., to Trimble, about 11 miles, to supply a more direct route.

SHAWNEE, GUTHRIE & NORTHWESTERN.—This company was incorporated in Oklahoma Territory Nov. 29 to build a line from Shawnee northwest to Guthrie, and thence west to Enid or northwest to Kingfisher; also a line from Shawnee southeast through Indian Territory into Arkansas. The officers and directors are given under Elections and Appointments.

SIERRA OF CALIFORNIA.—Engineers are locating a cut-off near Jamestown, Cal., which it is reported will be about five miles in length. The object of the cut-off is to obtain a better grade. Rails have been already received for the proposed cut-off.

SOUTHERN PACIFIC.—The extension of the Visalia Branch from Visalia, Cal., southeast 10.12 miles to Exeter was opened Nov. 29, to be operated as part of the San Joaquin Division. (Oct. 21, p. 759.)

TEXARKANA & SHREVEPORT.—Press reports state that this company expects to complete laying rails on the 20-mile gap between Shreveport and Texarkana by Jan. 1. (Nov. 25, p. 853.)

TUSCARORA VALLEY.—Grading is completed to Neelyton, and bridges to Nossville, on the extension from Port Royal, Pa., southwest 31 miles to McConnellsburg. Track laying was to be begun last week. (Nov. 25, p. 853.)

VERA CRUZ & PACIFIC.—W. W. Penny, Chief Engineer, has returned to Mexico City, after a trip to the camps of the locating engineers. He reports the locating survey completed as far south as the Papaloapan River, 130 km. from Vera Cruz and 175 km. from Cordova, making 305 km. (190 miles) ready for grading. The road as projected is to connect Vera Cruz with Salina Cruz, on the National Tehuantepec. Alfred Bishop Mason of 7 Pine street, New York, has the concession. (Oct. 28, p. 786.)

WEST BRANCH VALLEY.—The route of this proposed line is from Clearfield, Pa., on the Buffalo, Rochester & Pittsburgh, east 118 miles to Williamsport, on the Philadelphia & Reading. Surveys, location, adoptions, etc., have just been completed, but contracts will not be let for some time. (Official.) The officers are given under Elections and Appointments. (Nov. 25, p. 853.)

WESTERN AMERICAN COAL.—Track is reported laid for 3½ miles on the line from Carbonado, Wash., on the Northern Pacific, to the company's mines at Fairfax, seven miles. It is expected that the line will be completed by March next. T. B. Corey of Seattle, Wash., is General Manager. (July 15, p. 522.)

WHITE PASS & YUKON.—The British Columbia Yukon Ry. Co., which owns a section of this proposed line in British Columbia, has given notice through Albert Cassidy, Solicitor, at Victoria, B. C., that application will be made at the next Legislative Assembly of the Province of British Columbia for an act amending the old charter so as to confer power to build a branch line from a point on the main line to the Taku arm of Tagish Lake, and thence by the most feasible route to Atlin City.

YORK SOUTHERN.—S. M. Manifold, General Manager, of York, Pa., informs us that he has taken the contract to build the Dallastown line from the York Southern at Red Lion, Pa. This is an independent road 1.25 miles long. The grading is sub-let to John Dobbling, Madison avenue, York. (Nov. 18, p. 838.)

Electric Railroad Construction.

ASHCROFT, B. C.—Messrs. McPhillips & Williams will apply to the next Legislative Assembly of the Province of British Columbia for an act to incorporate a company to build a railroad, presumably electric, from a point on or near the Canadian Pacific Ry., near Lytton, at the junction of the Fraser and Thompson rivers, and thence to run north by the most feasible route.

ATLANTA, GA.—A party of Baltimore capitalists, representing the interests which recently bought the Atlanta Ry. Co., has been inspecting the property. The road is to be extended 10 miles and the engineers are making the surveys. (Nov. 25, p. 854.)

BALTIMORE, MD.—The Baltimore Consolidated Ry. Co. will issue $500,000 additional stock to secure funds to pay for the Elliott City branch of the Columbia & Maryland Ry., which the company recently bought, and to meet the cost of equipping the line for service. (Apr. 1, p. 248; May 27, p. 384.) The company has applied for permission to lay double tracks on Chase St., east to the city limits, and on Bond St., from North Ave. to Platt St. The company offers the city $10,000 for this addition to the franchises which it already holds. The company also wants to lay double track on Second Ave.

BATTLE CREEK, MICH.—George W. Bullis, a lawyer, of Ann Arbor, is reported interested in a project to build an electric railroad from Battle Creek to Hastings, work to begin in the spring.

BIRMINGHAM, ALA.—It is reported that the Birmingham Traction Co. is asking bids for rails, cross-ties and other material for an extension from Woodlawn to Eastlake. A. T. London, President.

BIRMINGHAM, MICH. — Almeron Whitehead, Frank Hagerman, Geo. E. Daines, of Birmingham; George T. Hendrie, of Detroit, and Michael F. Lillis, of Pontiac, have been granted a franchise by the City Board to build an electric railroad 2½ miles long, from Circle City to Birmingham. The road will eventually reach Orchard Lake.

BOISE, IDAHO.—The Wardner, Kellogg Electric Ry. Co. has been incorporated, with a capital stock of $500,000. The incorporators are: Bartlett Pressley and Margaret Pressley, of Kellogg; Laurence O'Neill, of Murray; B. Flaig, of Wardner, and Wm. W. Woods, of Wallace. The road the company proposes to build is from Kellogg, through Wardner, to Bunker Hill, and from Kellogg to Government Gulch.

BROOKLYN, N. Y.—Oliver W. Ingersoll has brought suit against the Nassau Electric Ry. Co. to restrain the company from operating its road on Bergen St., between Nostrand and Rogers Aves., on the ground that it had not obtained consent of the property owners along the line. The case was taken up in the Court of Appeals, Albany, N. Y., Nov. 29.

BUFFALO, N. Y.—The Crosstown St. Ry. Co., controlled by the Buffalo Ry. Co., has applied for permission to build in Bailey Ave.

CHARLESTON, ILL.—The Charleston & Mattoon Electric RR., which was recently incorporated, has secured right of way from Charleston to Mattoon, 12½ miles. It is reported that preliminary surveys have been made. Henry Rawrie, Anderson, Ind., Chief Engineer. (Nov. 25, p. 853.)

CHATTANOOGA, TENN.—S. W. Divine has tendered the city $250 as payment of the first installment of the $4,000 which he is to pay for the franchises granted the Chattanooga Rapid Transit Co. to build on Market St. The city has declined to accept the tender, claiming that the franchise was not legal.

CHICAGO, ILL.—An ordinance has been introduced into the City Council, granting the Chicago City Ry. the right to maintain the overhead trolley route on State St. and Wabash Ave., which they were permitted to build temporarily to accommodate the cars running on the Clark St. line, which line was interrupted at Sixteenth St. by the elevation of the tracks of the St. Charles Air Line. The Mayor of Chicago is opposed to maintaining the loop. (Apr. 1, p. 246.)

The Chicago & Fox Lake Electric RR. Co., which was recently incorporated, contemplates building a cross-country line from Fox Lake to the lake shore. The company was granted a 25-year franchise Nov. 29, in Waukegan, Ill.

CLEVELAND, O.—The Cleveland Electric Ry. Co. is about to erect a new power house on Cedar Ave., costing about $35,000. Supt. J. J. Stanley says that a 3,800-h. p. generator is to be put in the plant.

DAYTON, O.—It is reported that surveys have been completed for the recently incorporated Dayton & Xenia Traction Co. The road is to be 16 miles long, and will connect Dayton and Xenia via Alpha and Trebeins. J. M. Wilson, Chief Engineer, Dayton. (Nov. 4, p. 805.)

ELIZABETH, N. J.—The Supreme Court at Trenton, N. J., declared, on Dec. 5, to be constitutional the "Squier" Trolley Bill, under which the Union County Board of Freeholders disposed of a franchise for an electric railroad over the road from Elizabeth to Plainfield to Congressman John Kean for $250,000, the money to be used for widening and improving the road. The act was attacked by interested property owners. The building of the road will not be resumed. (Feb. 11, p. 111; Aug. 12, p. 587; Aug. 19, p. 604.)

ERIE, PA.—An ordinance has been passed allowing the Erie Rapid Transit Co. in the northeast borough. (Sept. 30, p. 715.)

The City Council has also granted permission to the Erie Electric Motor Co. to extend its West Twenty-sixth St. line. (Sept. 23, p. 697.)

HOLBROOK, MASS.—E. E. Chapman has petitioned the town for a franchise to build an electric railroad between Holbrook and South Weymouth, about three miles.

JOHNSTOWN, PA.—A franchise has been granted to the recently incorporated Johnstown & Somerset Traction Co. to build through the city. The road is to be eight miles long and is to run through Johnstown to Geistown, Scalp Level and Windber. Morris L. Wolf, Johnstown, is President. (Oct. 21, p. 769.)

KANSAS CITY, MO.—According to reports, the Northeast Electric Ry. Co. is contemplating building a complete double track road the entire length of the line, eight miles, using 150-lb. rails. A new bridge at Agnes Ave. will have to be built, the cost of which will be about $30,000.

LOCKPORT, N. Y.—The Buffalo & Lockport Electric Ry. Co., which acquired the Buffalo, Kenmore & Tonawanda in August last, is said to be negotiating for a franchise to double track along Delaware St.

MIMICO, ONT.—It is understood that the Mimico Electric Ry. Co. has decided to extend its railroad to the Long Branch Ranges, and probably to Lorne Park.

MONTREAL, QUE.—A. J. Corrinean, promoter of the Montreal & Southern Counties Ry., has received a request from the citizens of St. Cesaire, Que., to build a branch from Chambly to Abbotsford, St. Cesaire, Grandby and Waterloo. (Jan. 2, p. 71.)

MT. VERNON, N. Y.—The New York, West Chester & Connecticut Traction Co. has applied for a franchise in East Lincoln Ave. and through other streets, to the western boundary line of the city. In return for the franchise, the company offers to convey passengers to 134th St., New York, and give all concessions recently made by the Union Railway Co.

The West Chester Electric RR. Co. has asked for a franchise in New Rochelle for a line in Main St. from Center Ave., to Huguenot St., in New Rochelle. The time has been extended to May 1 to complete the road to the Mt. Vernon line. (Oct. 21, p. 769.)

NEWARK, N. J.—The B. M. & J. F. Shanley Co. has completed the extension of the line of the North Jersey St. Ry. in Irvington, N. J., 1,800 ft. on Clinton Ave. (Nov. 25, p. 853.)

NEWPORT NEWS, VA.—The material for the building of the Newport News & Old Point Ry. & Electric Company's lines has been delivered, and work will shortly begin on the building of the road. The company recently bought the Newport News, Hampton & Old Point Electric Ry. (June 10, p. 421.)

NEWTOWN, PA.—The Newtown Electric St. Ry. has been granted a franchise to build through the town in connection with its Doylestown extension. (Sept. 23, p. 697.)

NEW YORK, N. Y.—The car sheds of the Union Ry. Co., which operates all the electric roads above the Harlem River in the Borough of the Bronx, were totally destroyed by fire Nov. 30. The building was a brick structure, with a frontage of 175 ft. Many cars were burned and traffic was suspended on the road for a while.

OSWEGO, N. Y.—George B. Leonard is reported interested in the building of an electric road between Oswego and Syracuse.

PARRY SOUND, ONT.—At a recent meeting of the Board of Trade a committee was appointed to secure information as to the cost of building an electric railroad to connect Parry Sound and Depot Harbor.

PASADENA, CAL.—T. E. Gibbon, Vice-President of the Terminal Ry., has applied to the City Trustees for a franchise for a single track electric railroad from the present line of the Terminal, east on Colorado St., to Raymond Ave. If the franchise is granted, the work is to begin within six months.

PETERSBURG, VA.—The Virginia Traction Co. has been organized with the following officers: President, T. O. Troy, of Charlottesville; Vice-President, Augustus Wright, of Petersburg; Secretary, Charles Hall Davis, of Petersburg; Treasurer, R. J. J. Spratley, of Petersburg. The Directors are T. O. Troy, M. Leterman, C. H. Walker, A. N. Peyton, of Charlottesville; Augustus Wright, Francis R. Lassiter and Charles Hall Davis, of Petersburg.

PHILADELPHIA, PA.—The Delaware County & Philadelphia Electric Ry. has taken preliminary steps to build additional electric lines through Delaware County. It is reported that the roads will reach Weadon, Cardington, Llanerch, Lansdowne, Marple, Media, Wallingford and Clifton Heights, and are to have a connection with the Chester & Media. The road is already completed from Media, Pa., to Baltimore Ave., Philadelphia, where it connects with the Chestnut & Walnut St. line of the Union Traction. J. S. Austin, President.

The injunction restraining the Philadelphia, Castle Rock & West Chester Ry. Co. from crossing the Gay street bridge, owned by the Pennsylvania RR. and crossing the steam railroad tracks, has been dissolved.

An ordinance has been introduced into the City Department to authorize the Union Traction Co. to build on the Island road from Woodlawn Ave. to Eastwick Ave., to Ninety-second St. John B. Parsons, Vice-President and General Manager.

PLAINFIELD, N. J.—The City Council has been petitioned by the Plainfield Ry. Co. for a franchise to extend its lines to Scotch Plains. (Sept. 9, p. 657.)

PORTLAND, ORE.—An ordinance has been granted to the City & Suburban St. Ry. Co., to build on Twenty-second St. (Dec. 12, p. 869.)

RICHMOND, KY.—Frank Adair and D. J. Hauss of Cincinnati, O., are reported as endeavoring to secure from the city a franchise to build an electric railroad in the city.

RUTLAND, VT.—A franchise has been granted to the Lake Durand Power & Traction Co. to build a railroad 25 miles long from Lake Durand to Brandon, Pittsford and Rutland. E. D. Blackwell, Montpelier, Vt., is reported as interested in the project.

ST. CATHERINES, ONT.—Incorporation will be asked at the next session of Parliament of a company known as the Niagara Falls & Ontario Ry. Co., with power to acquire the St. Catherines & Niagara Central Ry., and to extend the road to Port Dalhousie and Hamilton. The S. C. & N. C. was recently bought by Hon. Chas. D. Haines, 100 Broadway, New York. (Dec. 12, p. 816.)

TAUNTON, MASS.—The Taunton & East Taunton St. Ry. has received permission to issue $50,000 original stock. The roadbed, about four miles, will cost $33,000; the overhead construction $8,000, and the rolling stock $9,000. J. P. Dunn, Taunton.

TORONTO, ONT.—Messrs. Nesbitt, Gauld & Dickson are applying to the Legislature for an act to incorporate the Hamilton & Caledonia Ry. Co. The road is to run from Toronto to Caledonia and Selkirk.

VANCOUVER, B. C.—The British Columbia Electric Ry. Co. will commence work at once on its new power house. A proposal is under consideration to build a branch railroad along Davie St. to English Bay. (Sept. 9, p. 657.)

WASHINGTON, D. C.—The people living in N. E. Washington and Eckington are endeavoring to have an electric road built to their district, via Florida Ave. They have asked the Capital Traction Co. to extend its line on that avenue.

It is reported that the Columbia RR. is considering the proposition for building a new section of line along Benning road to the district line. R. F. Baker, 1509 Florida Ave., N. E., President.

According to reports, the Washington Suburban Electric Ry. will begin running its cars on the completed part of the line Dec. 25.

WATERBURY, CONN.—A charter has been applied for to build an electric road from Southington to Waterbury, about 10 miles. (Nov. 4, p. 805.)

WILLIAMS BAY, WIS.—H. N. Bates, General Manager of the Continental Construction Co., Boston, Mass., has offered to build a much talked of electric railroad from Harvard, McHenry County, Ill., to the head of Geneva Lake. He offers to have the road finished and in operation by next June. This is, however, contingent upon the city of Harvard subscribing for $12,000 worth of bonds, and the village of Walworth donating a site for the power plant. The road is to be standard gage, and will handle both passengers and freight.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

Oct. 31.		1898.	1897.	Inc. or Dec.	
Chicago, Rock Island & Pacific.					
1 month	Gross	$2,161,779	$1,999,822	I.	$161,957
1 "	Net	922,950	840,295	I.	82,655
7 months	Gross	12,718,550	11,416,068	I.	1,302,482
7 "	Net	4,450,263	4,088,579	I.	361,684
Cleveland, Cincinnati, Chicago & St. Louis.					
1 month	Gross	$1,325,216	$1,297,581	I.	$27,635
1 "	Net	379,316	275,178	I.	104,138
4 months	Gross	5,181,245	4,886,343	I.	294,902
4 "	Net	1,505,760	1,116,382	I.	389,378
Denver & Rio Grande.					
1 month	Gross	$898,372	$791,957	I.	$97,415
1 "	Net	385,685	315,953	I.	69,732
4 months	Gross	3,208,668	2,906,383	I.	302,285
4 "	Net	1,367,560	1,199,743	I.	167,817
Erie.					
1 month	Gross	$3,116,147	$3,269,292	D.	$153,145
1 "	Net	1,040,600	997,629	D.	42,970
4 months	Gross	11,619,179	12,491,648	D.	872,469
4 "	Net	3,586,282	3,690,675	D.	104,393
Long Island.					
1 month	Gross	$395,450	$362,426	I.	$33,024
1 "	Net	115,376	104,009	I.	11,367
4 months	Gross	2,122,135	1,897,807	I.	224,328
4 "	Net	864,195	789,595	I.	74,600
Long Island System.					
1 month	Gross	$410,075	$380,795	I.	$29,280
1 "	Net	113,298	105,784	I.	7,514
4 months	Gross	2,365,740	2,130,107	I.	235,633
4 "	Net	982,015	913,192	I.	68,823
Louisville & Nashville.					
1 month	Gross	$2,102,886	$1,868,454	I.	$234,432
1 "	Net	811,202	618,261	I.	192,941
4 months	Gross	7,738,255	7,306,887	I.	431,368
4 "	Net	2,545,103	2,496,102	I.	49,001
Mexican Central.*					
1 month	Gross	$1,236,907	$1,085,182	I.	$151,725
1 "	Net	449,364	338,727	I.	110,637
10 months	Gross	10,974,722	10,491,975	I.	482,747
10 "	Net	3,372,165	3,142,516	I.	229,649
*Mexican currency.					
Mexican International.*					
1 month	Gross	$281,462	$246,144	I.	$35,318
1 "	Net	119,941	100,897	I.	19,044
10 months	Gross	2,768,316	2,505,892	I.	262,424
10 "	Net	1,106,097	911,106	I.	194,991
*Mexican currency.					
Mexican National.*					
1 month	Gross	$575,561	$525,213	I.	$50,348
1 "	Net	310,908	264,922	I.	46,086
10 months	Gross	5,126,887	4,986,859	I.	140,028
10 "	Net	2,391,989	2,431,507	D.	39,518
*Mexican currency.					
New York, Ontario & Western.					
1 month	Gross	$368,327	$370,412	D.	$2,085
1 "	Net	110,182	119,238	D.	9,056
4 months	Gross	1,457,706	1,521,592	D.	63,886
4 "	Net	447,476	502,984	D.	55,508
Norfolk & Western.					
1 month	Gross	$1,071,156	$955,893	I.	$115,263
1 "	Net	400,304	288,685	I.	111,618
4 months	Gross	3,900,631	3,883,176	I.	17,455
4 "	Net	1,338,607	1,260,490	I.	78,117
Oregon Railroad & Navigation Co.					
1 month	Gross	$816,017	$725,566	I.	$90,451
1 "	Net	402,983	403,558	D.	575
4 months	Gross	2,624,774	2,427,092	I.	197,682
4 "	Net	1,196,600	1,247,603	D.	51,003
Pacific Mail Steamship Co.					
1 month	Gross	$357,326	$293,553	I.	$63,773
1 "	Net	175,472	46,655	I.	128,817
6 months	Gross	2,302,725	1,974,985	I.	327,740
6 "	Net	918,633	378,819	I.	539,814
Rio Grande Western.					
1 month	Gross	$336,892	$345,877	D.	$8,985
1 "	Net	138,218	133,583	I.	4,635
4 months	Gross	1,183,242	1,239,183	D.	55,941
4 "	Net	417,955	489,755	D.	71,800
San Antonio & Aransas Pass.					
1 month	Gross	$257,292	$176,800	I.	$80,492
1 "	Net	118,214	61,710	I.	56,504
4 months	Gross	855,118	752,868	I.	102,250
4 "	Net	357,267	262,930	I.	94,337
Southern Pacific System.					
1 month	Gross	$5,556,725	$4,430,934	I.	$1,125,791
1 "	Net	2,345,093	1,862,637	I.	482,456
4 months	Gross	20,098,223	18,761,303	I.	1,336,920
4 "	Net	8,033,721	7,986,476	I.	47,245

Oct. 31.		1898.	1897.	Inc. or Dec.	
Union Pacific, Denver & Gulf.					
1 month	Gross	$391,815	$400,168	D.	$8,352
1 "	Net	189,176	188,365	I.	811
10 months	Gross	3,109,551	2,857,121	I.	252,429
10 "	Net	1,036,041	764,310	I.	271,730

Nov. 30.		1898.	1897.	Inc. or Dec.	
Chicago, Great Western & St. Paul.*					
1 month	Gross	$475,771	$473,542	I.	$2,229
5 months	Gross	2,488,513	2,397,490	I.	91,023
*Approximate.					

ATCHISON, TOPEKA & SANTA FE.—At the annual meeting of the stockholders, held at Topeka, Kan., Dec. 8, the project to buy the stock trust certificates, that is, in the San Francisco & San Joaquin Valley, was agreed to by the stockholders. (Oct. 28, p. 787.)

The Burlingame & Northwestern has discontinued the use of the Rock Island tracks between Alma and Manhattan, Kan., and all train service beyond Manhattan was discontinued Dec. 3.

BALTIMORE & ANNAPOLIS SHORT LINE.—The $325,000 new 5% 25-year bonds, offered at par by Alexander Brown & Sons, of Baltimore, were subscribed five times over. These are a part of the recently-authorized $400,000. (Nov. 11, p. 821.)

BALTIMORE & OHIO.—Default was made on Dec. 1 on the semi-annual interest on the $4,500,000 first mortgage 5% bonds of the Schuylkill River, east side. The B. & O. guarantees the loan and interest and operates the property.

At the special meeting of the stockholders of the Central Ohio, held at Columbus, O., Nov. 29, it was decided to accept the proposition of the reorganization managers of the B. & O., which proposes to take the common and preferred stock at par, with a bonus of $7.50 per share. (Nov. 25, p. 852.)

BALTIMORE & OHIO SOUTHWESTERN.—At the recent annual meeting, the company made public its financial plans as follows:

The progress of the reorganization of the Baltimore & Ohio RR. presents an opportunity for this company to determine its future relations with that reorganized company and to procure through the guaranty of its securities, etc., ample capital to complete the improvements proposed, and to place the property in a position where it can be successfully operated. Negotiations are now under way by the President and board of directors with the reorganization managers of the Baltimore & Ohio RR. Company. In order to meet present rate conditions the company should increase its motive power by securing a large number of heavier locomotives, at least 3,000 cars and expend at least $1,500,000 in the reduction of its grades, increase its sidings and remove the lighter rail from the line and replace it with heavier rail. It is estimated that the expenditure of at least $5,500,000 will be required to secure all the desired improvements, and the property will then be in a condition to meet prevailing low rates and secure profitable operation.

CENTRALIA & CHESTER.—In the Federal Court, at Springfield, Ill., Dec. 1, the hearing for the sale was again postponed. (Nov. 4, p. 805.)

CHICAGO & EASTERN ILLINOIS.—The Farmers' Loan & Trust Co., New York, gives notice that three bonds for $1,000 each, of the Indiana Block Coal RR. Co., have been drawn for payment Jan. 1, after which date interest will cease.

CHICAGO, BURLINGTON & QUINCY.—Fifty-three Iowa Division 5 per cent. bonds, dated Oct. 1, 1879, and 176 4 per cent. bonds, all of $1,000 each, have been drawn for payment at par and accrued interest to April 1, 1899, at the office of the company in Boston.

CHICAGO, INDIANA & EASTERN.—Harry E. Drew, of Fairmount, Ind., General Manager and contractor for the extensions now building, has begun an action in the Circuit Court for the C., I. & E., to compel an accounting from A. C. Frost & Co., Chicago, on the note for $42,500 secured by $125,000 of the company's bonds. The money has been used to extend the line, and it is alleged that A. C. Frost & Co. have paid but $38,800 of the entire amount.

COLUMBUS & CINCINNATI MIDLAND.—The Bondholders' Committee, of which Charles S. Hinchman, of Philadelphia, is chairman, has received an offer for the certificates for the first mortgage bonds deposited with the Guarantee Trust & Safe Deposit Co., of Philadelphia, which the committee considers satisfactory, and advises the holders to accept. (Nov. 11, p. 822.)

COLUMBUS, HOCKING VALLEY & TOLEDO.—The Ohio Supreme Court affirmed the decision of the lower court in the case of the Central Trust Co. of New York vs. Judge Stevenson Burk et al., the former owners of the company. The suit involves the issue of $8,000,000 bonds, and the Central Trust Co. moved for a dismissal of the case, which the lower court refused to grant. The effect of the decision is to send the case back to the Common Pleas Court, where the bondholders may push it if they so desire. (Nov. 11, p. 822.)

COLUMBUS, SANDUSKY & HOCKING.—Judge Taft, in the United States Circuit Court, at Cincinnati, O., has authorized the receiver to issue $323,000 certificates to pay for equipment already bought, and for the purchase of 200 new coal cars. (Nov. 4, p. 805.)

DENVER & RIO GRANDE.—Kuhn, Loeb & Co., and Speyer & Co., New York, announce that on Dec. 15 the privilege of converting the first mortgage 7% bonds, maturing Nov. 1, 1900, into new 4½% first consolidated bonds, at 104, will cease. (Aug. 19, p. 604.)

FLINT & PERE MARQUETTE.—This company has sold $500,000 of first mortgage 5% gold bonds, proceeds of which are to be applied to payment of floating indebtedness in building car ferries.

GENESEE & WYOMING VALLEY.—This road went into the hands of D. Hyman as Receiver, Nov. 15. It extends from Retsof, N. Y., to Pittsburgh and Lehigh Junction, 10.66 miles; Retsof Junction to Greigsville, 3.73 miles; Retsof Yards to Retsof Mines, 1.77 miles, making a total of 16.16 miles. The capital stock outstanding is $456,200, and the funded debt $500,000.

GEORGIA & ALABAMA.—C. Schumacher & Co., New York, the Baltimore Trust & Guarantee Co., Baltimore, Md., and the Richmond Trust & Safe Deposit Co., Richmond, Va., are offering at par and accrued interest $500,000 first mortgage consolidated 5 per cent. 50-year gold bonds, due 1945, interest payable January and July. These bonds are issued to build the proposed terminals at Savannah, Ga., and to make an extension of 17 miles from Meldrim, Ga., to Savannah, to take the place of the line now leased from the Central of Georgia. John Skelton Williams, President of the company, speaking of the proposed terminals at Savannah, says:

Within the past few months, parties acting in the interest of the G. & A. Ry. have secured on the Savannah River, directly opposite the city of Savannah, about one mile of water front and nearly 1,000 acres of land, admirably suited for terminals. A company known as the Georgia & Alabama Terminal Company has been organized for the purpose of owning the terminals and carrying out their development on a large scale. The entire capital stock of the Terminal Co. will be owned by the G. & A. Ry., which latter company guarantees the bonds issued by the Terminal Co. for this development. According to estimates carefully prepared by our Traffic Department, the possession of independent terminals at Savannah, after the first year or so, may very certainly be expected to increase the company's net revenues, after paying the additional fixed charges involved in the purchase of land and the construction of terminals, by more than $150,000 per annum. The terminal development at Savannah is now under way, and, it is hoped, will be completed by the opening of the next cotton season. With its own independent terminals at Savannah, the Georgia & Alabama Railway will be able to secure a larger proportion of the coal and iron business from the Birmingham region, having heretofore been cut off from this business almost entirely, owing to the want of adequate terminals at Savannah. By the extension of the Mobile & Ohio Railroad into Montgomery, the Georgia & Alabama Railway is given a new connection with St. Louis and the West, which is likely to be a source of much additional revenue to the company. The Georgia and Alabama Railway owns at Montgomery, Ala., nearly 60 acres of land in the business portion and suburbs of the city, sufficient to afford it all necessary terminal facilities at that point. (Railroad Construction Column, Oct. 14, p. 750.)

NORFOLK & WESTERN.—Arrangements have been made with the Atlantic Trust Co., of New York, to extend the Southside Railroad consolidated mortgage third preferred 6 per cent. bonds, maturing Jan. 1, 1899, until July 1, 1900, the extended bonds to bear interest at 4%. Holders of these bonds are notified to present them at the office of the Atlantic Trust Co. prior to Dec. 31, where they will be extended upon the payment of a premium of one-fourth of 1%.

OGDENSBURG & LAKE CHAMPLAIN.—This company was incorporated Dec. 1 (as railway instead of railroad), with a capital stock of $4,400,000. The directors of the new company are given under Elections and Appointments. The property of the company was sold May 2 to the reorganization committee. (Nov. 18, p. 840.)

PENNSYLVANIA COMPANY.—Sealed proposals will be received until Dec. 31, at the office of Winslow, Lanier & Co., New York, for the sale of $46,000 of general first mortgage bonds for the sinking fund, at a price not to exceed par and accrued interest.

PHILADELPHIA & READING.—The Pennsylvania Co. for Insurance on Lives and Granting Annuities, of Philadelphia, will receive up to Dec. 31 sealed offers, not to exceed par and accrued interest, for 33 of the 10-year sinking fund 5% gold loan bonds of 1902.

ST. LOUIS SOUTHWESTERN.—Application will be made to the next Legislature of the State of Texas for a special law empowering the S. L. SW. Ry. Co., of Texas, to acquire by purchase, and to consolidate with its own line, the Tyler Southeastern Ry., running from Tyler to Lufkin, 88½ miles; also to authorize corresponding increase of the aggregate bonds and stock of the company. The T. SE. already forms a part of the S. L. SW. system of lines.

SEABOARD AIR LINE.—At a special meeting of the directors at Baltimore, Md., Dec. 3, the examining committee recently appointed to investigate the charges of mismanagement preferred by Thos. F. Ryan, of New York, one of the large stockholders, made a report exonerating the officials of the company. The directors approved the report and passed resolutions of confidence in the management of the property. (Oct. 21, p. 770.)

SIOUX CITY, O'NEILL & WESTERN.—The mandate of the Supreme Court of the United States, recently given, allows the Credits Commutation Co., of Sioux City, until Jan. 8, 1899, to redeem from J. Kennedy Todd & Co., of New York, the $2,340,000 first mortgage bonds of this company, and $1,060,000 of the stock of the Sioux City & Northern, the title of which, according to the recent decision, was awarded to J. Kennedy Todd & Co. (Oct. 28, p. 788.)

STOCKTON & TUOLUMNE.—This company has disposed of its $1,000,000 issue of 40-year 6 per cent. bonds, of which the California Title, Insurance & Trust Company is Trustee. (Aug. 19, p. 603.)

TECHE RAILROAD & SUGAR COMPANY.—This company, which went into the hands of the receiver March 4, 1894, is still in the hands of the receiver. The property, consisting of 18 miles of road, is to be sold in January, 1899. John R. Jones, of Carencro, La., is the Receiver. (Official.)

TERRE HAUTE & LOGANSPORT.—This company was re-incorporated in Indiana, Nov. 30 (as railway instead of railroad), with a capital stock of $2,000,000. It will take possession of the property of the old company, which was recently sold at public auction to J. T. Brooks, representing the Pennsylvania Co. The incorporators are James McCrea, J. T. Brooks, E. B. Taylor, L. L. Gilbert and S. C. Scott, all officials of the Pennsylvania Co. (Nov. 25, p. 854.)

UNION PACIFIC.—The directors have decided to call a meeting of the stockholders for Jan. 10, to act upon the proposition to exchange at par Oregon Short Line stock for U. P. common stock. The total issue of the O. S. L. is $27,435,700, and a controlling interest therein was acquired several months ago by the reorganized U. P.

The Union Trust Company, New York, has made application before Judge Sanborn, in the United States Circuit Court, at St. Paul, for a decree of foreclosure under the U. P. land mortgage of 1873, securing the bonds known as sinking fund 8's, on which no interest has been paid since March, 1896.

These bonds are practically all held by the reorganization company, and the foreclosure is a formal matter to perfect the title to the lands. (Nov. 11, p. 822.)

UTAH CENTRAL.—Judge Hiles, at Salt Lake City, Utah, Dec. 1, ordered the removal of George D. Loomis, Special Master in the case of the Central Trust Co., New York, against the old company, and instructed George E. Blair, heretofore appointed, to examine the accounts of the Special Master, and to make a statement of the same to the court. Mr. Loomis has been missing for some time, and his whereabouts are not known. The road went into the possession of the Rio Grande Western, Dec. 17, 1897. (Jan. 28, p. 72.)

WHEELING & LAKE ERIE.—Officials of this company have filed an answer in the Federal Court at Columbus, O., to the petition of the Central Trust Co., New York, in which foreclosure was asked. The answer admits allegations of insolvency, which is a confession of judgment, and an order will be issued to sell the property. The road went into the hands of a receiver Jan. 15, 1897.

WICHITA & WESTERN.—Judge Williams, at Topeka, Kan., Nov. 29, entered a decree of foreclosure in the case of the Union Trust Co., New York, against this company. The foreclosure sale will take place at Kingman at a date not yet fixed. J. H. McEntire will act as Special Master. The decree provides for a deposit from each bidder of $12,500 in cash, or $25,000 in bonds of the road. The W. & W. went into the hands of a receiver Jan. 14, 1895. At that time it comprised 79.5 miles, but a large part of this mileage has since been abandoned. The Atchison, Topeka & Santa Fe holds most of the bonds.

Electric Railroad News.

BROOKLYN, N. Y.—The gross earnings of the Brooklyn Rapid Transit Co. for the month of November and the five months ending Nov. 30 were as follows:

	1898.	1897.	1896.
November	$446,501	$417,818	$403,165
Five months	2,614,732	2,271,539	2,210,435

CHICAGO, ILL.—The North Chicago Electric Ry. reports for the month of November a gain of $4,777 over the corresponding month of last year. The gross receipts amounted to $236,037, against $231,260 in 1897.

Secretary F. R. Greene of the Chicago City Ry. Co. has issued notices that the annual meeting will be held Jan. 16, and that the business that will come up in addition to the election of Directors will be increasing the capital stock "in an amount or sum not to exceed $2,000,000, at the option of the Directors." The present stock of the road is $12,000,000, and in addition there are $4,619,500 4½ per cent. bonds. The new issue will make the capitalization of the company $18,619,500.

COLUMBUS, O.—Twenty-one first mortgage gold 5 per cent. bonds of 1889, issued by the Columbus Consolidated St. RR., now the Columbus St. RR., have been drawn for the sinking fund and will be paid at the Central Trust Co., New York, on and after Jan. 1, 1899, at 110, together with the coupons maturing Jan. 1, 1899.

DENVER, COL.—The foreclosure sale of the Denver City RR. and the West End St. Ry, which is owned by the Denver City RR., will be held Dec. 15 by United States Commissioner Hinsdale. (April 1, p. 248; Nov. 11, p. 822.)

NASHVILLE, TENN.—The Nashville St. Ry. has called for the redemption of $50,000 of South Nashville St. RR. 6 per cent. bonds. The bonds will be redeemed in cash at the First National Bank, Dec. 31. This block, together with the previous call, leaves a total indebtedness on the South Nashville lines of $115,000. (Oct. 14, p. 752.)

NEW YORK, N. Y.—At the annual meeting of the stockholders of the Metropolitan St. Ry. Co., held Dec. 5, the following Directors were elected: H. H. Vreeland, W. L. Elkins, Thomas F. Ryan, Charles E. Warren, Henry P. Whitney, P. A. B. Widener, Thomas Dolan, D. B. Hasbrouck and H. A. Robinson.

OSWEGO, N. Y.—In the Supreme Court, Nov. 30, Justice Wright granted the motion of the Knickerbocker Trust Co. of New York to foreclose bonds against the Oswego St. Ry. for $125,000, and ordered the sale of the road. The sale is to take place within six weeks. The Oswego St. Ry. forms, with the consolidation of the Fulton & Oswego Falls St. Ry., the Lake Ontario & Riverside Ry. Co. The L. O. & R. Ry. Co. went into the hands of a receiver Oct. 3, 1896.

ST. LOUIS, MO.—The Lindell Ry. was sold Dec. 6 for $8,500,000 to Brown Bros., financial agents, of New York. The sale includes the Page avenue, the Taylor and Finney streets, Delmar avenue, Chateau Park and Spalding avenue divisions. The Lindell Ry. Co. controls the Missouri RR., the Compton Heights Union Depot & Merchants Tr. Ry. and the Taylor Ave. Ry. The franchise of the Lindell was recently extended for 50 years.

The National Ry. of Chicago was sold to the Southern Electric Ry., Dec. 6. The National Ry. was chartered in Des Moines under the Laws of 1889. The property sold includes the Northern Central Ry., Cass Avenue & Fair Grounds Ry., Union RR., Citizens Ry., Baden & St. Louis RR. and the Southwestern Ry.

WASHINGTON, D. C.—The District Court has ordered the sale of the Anacostia & Potomac St. RR. at auction at 3 p. m. on Dec. 22. Henry Griswold and Benjamin S. Minor were appointed receivers April 1, 1898. It is believed that the road will be bought in the interest of the City & Suburban Ry., whose representatives own the majority of the stock. (Nov. 11, p. 822.)

TRAFFIC.

Traffic Notes.

It is reported that the Ohio Coal Traffic Association has been dissolved.

Prominent members of the Minneapolis Chamber of Commerce are taking steps to have the Chamber establish a freight bureau, with a competent traffic man for Commissioner.

As a result of the injunction against the Texas Railroad Commissioners' rates, issued Dec. 2 by Judge McCormick, the 10 railroads included in the order have restored all rates to those in force before the Commission began making rates. There will be an increase in freight rates of about 10 per cent.

The movement of freight over the Pennsylvania RR. through Altoona Dec. 3 broke all previous records, nearly 5,000 cars being handled. The exact figures were: Eastbound cars, 2,529; westbound cars, 2,277; total, 4,806. The tonnage far exceeds all former records.

Officers of the Post Office Department at Chicago are considering a plan to save 15 hours in the transportation of mail between New York and San Francisco. It is proposed to run the fast mail train from New York to Chicago in 23 hours and from Chicago to Omaha in 11 hours.

The United States Quartermaster at San Francisco has received bids for carrying 1,316 soldiers from San Francisco to New York at $9.90 per capita. The highest bid received under the same offer was $40.06. Press dispatches do not give the name of the companies making the low bid.

Minneapolis newspapers now report that the flour situation, which a few weeks ago they said was the subject of a beautifully working pool, is now badly demoralized. Five roads have concluded that they do not wish to carry any flour at the rates now prevailing and the other two are said to be offering a rate through to New York, all rail, of 20.5 cents per 100 lbs.

The Philadelphia, Wilmington & Baltimore and the Baltimore & Ohio have withdrawn the 100-ride tickets which they have been selling between Wilmington and Philadelphia at $20 each. Passengers will now have to pay the regular rate of $1 for a round trip. The distance between the two cities is 27 miles. It is said that the $20 tickets were used a great deal by speculators, who rented them to their friends for single excursions at an advance of 25 per cent.

The agreement recently reached by the Canadian Pacific and the Grand Trunk to restore tariffs on business throughout the lines of the companies in Quebec and Ontario, provided for the use by the Canadian Pacific of the line of the Grand Trunk from Toronto north 227 miles to North Bay, and Canadian Pacific passenger and freight trains began running over the line Dec. 1. The restoration of second-class fares to the West will turn to the Canadian Pacific line (north of Lake Superior) considerable numbers of passengers which have heretofore gone West by the Grand Trunk through Chicago, and the railroads between Chicago and St. Paul are complaining of their loss.

Secret Rates on the Chesapeake & Ohio.

The investigation of charges of discrimination in coal rates, made against the Chesapeake & Ohio Railway, by Charles G. Blake, of Cincinnati, O., was held by the Inter-State Commerce Commission, in Washington, Nov. 28 and 29, and a sensation was created by the frank admission of the officers of the road that the law had been violated. George W. Benjamin, General Coal Freight Agent of the road, stated that not one of the railroads with which he was in competition followed the published tariffs; each allowed rebates, in so far as it was found advisable to do so, in order to get business one from the other. Mr. Benjamin when cross-questioned acknowledged that the only purpose served by the published tariff was to confuse competitors and prevent the actual rate charged by each from becoming known to the other. As reported in the Washington Post, "the witness reluctantly admitted that the Chesapeake & Ohio had persistently violated the terms of the Interstate Commerce Law, but stated, in extenuation, that it was made necessary to offer rebates in the form of commissions, in order to meet the conditions resulting from water competition and the competition of other railroads connecting various coal fields with the same points supplied by the Chesapeake & Ohio."

The charges were that for more than one year past the rates made from mines in the New River and Kanawha Districts have been below the tariffs; and that the road had discriminated against Blake and other Cincinnati coal dealers in favor of the Chesapeake & Ohio Fuel Co., of Cincinnati, in facilities.

Mr. Benjamin stated that the Chesapeake & Ohio had, for two years past, and up to the 1st of October last, been in the custom of allowing a rebate or commission to coal shippers, which in effect amounted to a reduction in the tariff rates. Such a reduction had been allowed Mr. Blake, the complainant, up to the time of filing of charges against the road. He denied that any wrongful discrimination had been shown against Mr. Blake and other dealers in favor of the Chesapeake & Ohio Fuel Co., and stated that this company controlled almost the entire output of the Kanawha District, for which reason it had been granted better terminal and car facilities. Evidence was offered in the form of statistics, showing the output of the mines and the business done by the road, for the purpose of showing that a cut in the tariff rates was necessary to the existence of the road if it was to continue in competition with other roads that also cut the tariff rates. The competing roads were the Louisville & Nashville, the Cincinnati Southern, and the Baltimore & Ohio Southwestern. The Louisville and Nashville had a haul of 300 miles from the coal fields to Cincinnati; the Cincinnati Southern, 225 miles; the Baltimore & Ohio Southwestern, 300 miles from the West Virginia coal district, and 85 miles from the Ohio Districts; the Chesapeake & Ohio, 250 miles from the New River District, and 225 miles from the Kanawha District.

Eighty per cent. of the coal (for Cincinnati) came by water, and this was divided between the Pittsburg and Kanawha Districts, the former furnishing two-thirds and the latter one-third of the amount. Of the coal brought into Cincinnati the Chesapeake & Ohio hauled 14 per cent., leaving but 6 per cent. for the other rail lines. Mr. Benjamin stated that neither road knew what the other was charging.

In answer to questions, Mr. Benjamin stated that the stock of the Chesapeake & Ohio Fuel Co. was not owned by any person having interests in the Chesapeake & Ohio Railway Co., and that the interests of the two corporations were entirely distinct.

On the second day, M. E. Ingalls, President of the road, testified. Mr. Ingalls said that he had learned that his road had been persistently violating the law. The business of making rates had been left entirely to Mr. Benjamin, and the witness did not know until recently that Mr. Benjamin had failed to publish tariffs and that the road was violating the law. The cutting, as Mr. Benjamin had testified on the preceding day, was the almost inevitable result of the peculiar competitive conditions that existed. Mr. Blake had not been discriminated against. Mr. Ingalls had always been friendly to him; in fact, was now on his bond for $50,000 in a big coal contract. But Mr. Blake only wanted viaduct facilities so as to cause trouble among the other dealers. That was the reason he didn't get what he wanted.

But to settle the whole thing, Mr. Ingalls wanted it understood that the road was tired of the way things had been going. There would be no more rate cutting, and while it might not please the coal operators it might as well be known that the road proposed to raise the rates, publish a tariff, and require everyone to live up to it. What the result would be he knew not. The road would try to live and the coal operators might live and they might go broke. The new tariff would be higher than the present charges and the contracts which the road was under for different rates would furnish material for his legal friends to wrestle with. The road would probably have to pay damages on account of these contracts, but well and good. The policy from now on would be a close observance of the Inter-State Commerce law. He proposed to keep out of the penitentiary, and coal rates were going up.

Attorney Ramsey, for Blake, told the Commission that if all these things were coming to pass, his client had obtained all that he came to court for. If the road was going out of the business of selling coal Mr. Blake would probably get a show. If there was to be no discrimination in rates or terminal facilities Mr. Blake would be happy.

Attorney J. W. St. Clair, for the road, said he was glad that Mr. Blake was glad. The whole proceeding had, he thought, been most extraordinary. Mr. Blake held a contract with the road calling for a rate in violation of the law, and had presumed to complain and endeavored to have a court help him along in the coal business. Mr. St. Clair was hopeful that the investigation would be productive of good results and in throwing the guilty party upon the mercy of the court, he eloquently drifted into the war theme, and told how some of the coal used by United States vessels in the Hispano-American victories had been hauled by the cars of his company.

Chairman Knapp termed the disclosures a regretable condition of affairs in the management of the railroad. Whatever might have been the motives of the complainant in bringing the matter to the attention of the Commission, he was to be praised. And the railroad was entitled to commendation for its frank acknowledgement of misdeeds and for making known the true existing conditions. It was gratifying to the Commission to know that the road was going to conform to the law in the future, and the investigation had proved of value to the public in giving an understanding of the conditions.

Chicago Traffic Matters.

Chicago, Dec. 7, 1898.

After a long continued display of patience the Western roads have turned a cold shoulder to the Chicago Great Western, and have broken off all traffic relations with it. The Santa Fe announces that it will have nothing more to do with the C. G. W., and that all through traffic arrangements must cease Dec. 15. Baggage checked through will neither be delivered nor received, and passenger and sleeping cars will not be interchanged. So far as possible all freight relations are cut off. The Rock Island has given notice similar to the Santa Fe's. The C. G. W., it is alleged, refuses to share in the expense of legitimate bureaus, while it desires all the benefits of the same; peculiar, double-meaning tariffs are issued, and other underhanded tactics resorted to to influence business. Officers of the Great Western say they have done nothing to warrant the action of the Santa Fe and the Rock Island.

Western rates continue to tumble. The Alton has reduced its live stock rates on trans-Missouri shipments to Chicago and Peoria to 15 cents per 100 lbs., and to East St. Louis to 10 cents.

Two local brokers, Stein and Rice by name, have been arrested, charged with receiving several thousand dollars worth of mileage books and fifty employes' passes of the Chicago & Northwestern road. The men have been released on bonds.

The Canadian Pacific is still causing all kinds of trouble to the lines between Chicago and St. Paul. Its latest offensive declaration is a notice that it will continue to use as a basing rate the $10.50 rate put in by the Chicago-Missouri River roads during the Omaha exposition. Chairman Caldwell, of the Western Passenger Association, is now trying to arrange for a conference of the Northwestern roads and the Canadian Pacific.

Eastbound shipments of flour, grain and provisions from Chicago and Chicago junctions to and beyond the western termini of the Trunk Lines, for the five weeks ending Dec. 1, amounted to 486,114 tons. This statement includes 70,925 tons of flour, 322,453 tons of grain, 92,736 tons of provisions. The following table shows the quantities carried by the respective roads:

	Tons.
Baltimore & Ohio	55,848
Cleveland, Cincinnati, Chicago & St. Louis	24,702
Chicago & Erie	48,783
Grand Trunk	43,976
Lake Shore & Michigan Southern	65,257
Michigan Central	59 513
New York, Chicago & St. Louis	31,021
Pittsburg, Cincinnati, Chicago & St. Louis	49,344
Pittsburg, Ft. Wayne & Chicago	78,022
Wabash	25,548
Total	486,114

Eastbound shipments from Chicago, as reported weekly by the Board of Trade, were, for the five weeks ending Dec. 1, 499,933 tons, compared with 253,776 tons for the corresponding period of last year. The statements of freight shipped eastward from Chicago are made up on two bases. The first statement given above is that furnished by the Chicago Freight Committee. It covers only three principal classes of freight, and it includes only such shipments as are carried through to Buffalo, Pittsburg, Wheeling, etc.; but it includes shipments from all junctions in Cook County, and from some other points, including all from the Elgin, Joliet & Eastern Railroad. The second statement does not include shipments from the junctions outside the city, but it does include practically all kinds of freight except live stock; and it shows the total shipments by the roads mentioned to all points, both through and local.